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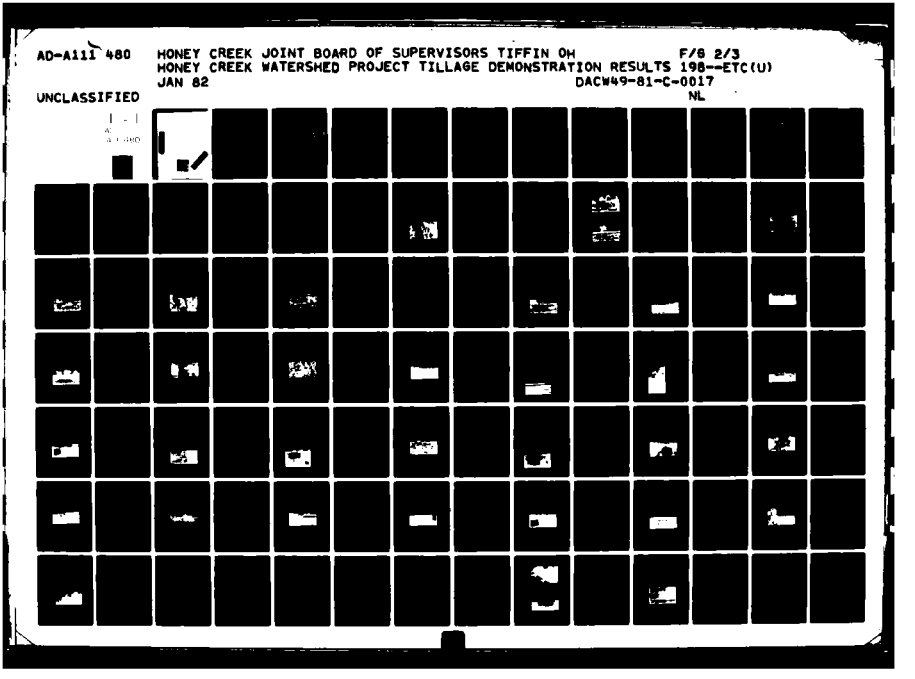

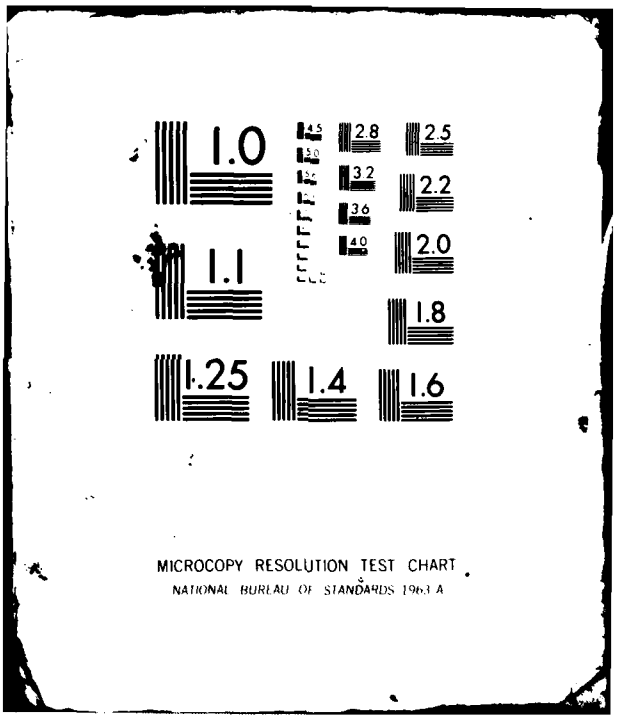
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Best Management Practices

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Treatment of diffuse of "nonpoint" phosphorus sources will be required for Lake Erie to return to previous levels of water quality. Of these nonpoint sources, nutrient runoff from agricultural watersheds is most significant. This publication reports results of the Honey Creek Watershed Management Program, a pilot demonstration project in which main emphasis was on "hands on" demonstrations.

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HONEY CREEK WATERSHED PROJECT

TILLAGE DEMONSTRATION RESULTS 1981

Project Report for
Contract DACW-49-81-C-0017

by

HONEY CREEK JOINT BOARD OF SUPERVISORS
Crawford, Seneca and Huron Counties, Ohio

January 1982

Lake Erie Wastewater Management Study
U. S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

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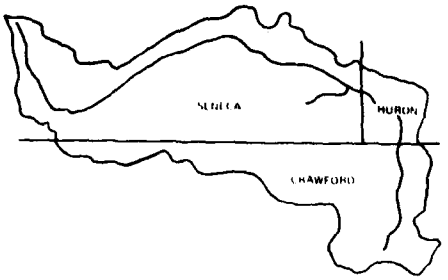

Honey Creek Watershed Management Project

COOPERATING AGENCIES
Soil Conservation Service — Soil & Water Conservation District
Cooperative Extension Service
Agriculture Stabilization and Conservation Service

155 E. Perry St.
Tiffin, Ohio 44883
January, 1982

Dear County Farmer:

Improving the quality of water draining from agricultural areas is a big job, but one which must be done. Done right, it does not need damage farm income. In fact, it may mean even more profit from your farm operation rather than less. Reduced tillage and no-till farming especially can improve water quality by reducing soil loss through erosion control. Soil retained in your fields means that expensive fertilizers, particularly phosphorus, and herbicides stay in place, too. Time and fuel savings help gain favorable returns from reduced tillage as well. Finally, taxpayer costs to clean ditches and dredge streams and lakes decrease. All of these factors, most of which benefit farmers directly, also improve water quality.

Through the Honey Creek Project, you, in cooperation with local agricultural agency people and farm service dealers, can work with us in determining ways to do our share of helping improve Lake Erie water quality. Together we should be able to demonstrate ways to do the water quality job--economically and practically.

This publication describes results of reduced tillage and no-till demonstration plots carried out within the Honey Creek watershed in 1981. These practices, when properly applied, not only reduce erosion, but also maintain or improve net farm income through economies of manpower, energy and machinery.

Please review the data presented. See how reduced tillage practices might fit into your farm operation. We feel that reduced tillage can directly benefit farmers while at the same time do the water quality job. What do you think? What is your solution? The job must be done!

Sincerely yours,

Lee E. Buckingham

Lee Buckingham, Chairman
Honey Creek Joint Board of Supervisors

lb/JC/jk

HONEY CREEK JOINT BOARD OF SUPERVISORS

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PROJECT STAFF

John Crumrine, Manager
Dave Wurm, Conservationist
Maurey Lewis, Technician

A special note of appreciation to Jean Knoblaugh who typed and re-typed the various portions of this manuscript.

DEDICATION

This 1981 Tillage Demonstration Results book is dedicated to Honey Creek Joint Board member Rondo Berlekamp, who in May was killed in a farm accident. Rondo served the Seneca Soil and Water Conservation District for 25 years and was instrumental in planning and beginning the Honey Creek Project.

SPECIAL ACKNOWLEDGMENTS

Successful accomplishment of tillage demonstration plots this year resulted from the combined efforts of farmers, agri-business interests and agricultural agency people. Without the support of these people, there would have been no demonstration plots. Special thanks and appreciation to the following people for their part in the demonstration effort:

CRAWFORD COUNTY

Farmer Cooperators:

Don Crum	Roger Marquart	Tom Niese
Jason Kalb	Geissman Farms	Don Phenicie
Gene Studer	Albert Heydinger	Ron Vanasdale
Ross Eckstein	Donald & Dave Crum	Niese Brothers
	Jim & Gerald Nedolast	

Task Force Members:

Bill Kleman, County Agent, Chairman
Floyd Reinhart, Agricultural Stabilization & Conservation Service
Bob Smith, Soil Conservation Service
Burton Geissman
Howard Von Stein
Milton Leonhart

SENECA COUNTY

Farmer Cooperators:

Art Hall	Tom Depinet	Herb Crum
Bill Smith	John Jacoby	Sam Allen
Paul Price	Jim Spitzer	Phil Dunn
Jerry Bumb	Rich Reichert	Duane King
Tony Schock	Bill Reichert	Galen King
	Paul & Carl Ziegler	

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Bill Smith, Seneca Soil and Water Conservation District
Gene Baltes, Soil Conservation Service
Sam Spitler
Phil Dunn
Delbert Morter
Paul Ziegler

HURON COUNTY

Farmer Cooperator:

Mark Fritz

Task Force Members:

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John Metz, Huron Soil and Water Conservation District
Jerry Beck, Agricultural Stabilization & Conservation Service
Carlos Tucker, County Agent

OTHERS

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Paul Price, Silver Valley Agricultural Services, Bloomville, Ohio
Melvin Speece, Landmark Crop Services, New Washington, Ohio
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Gary Heibertshausen, Seneca Landmark, Tiffin, Ohio
Scott Romine, New Washington Equity, New Washington, Ohio

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INTRODUCTION

As a result of 1972 Federal legislation, Congress has given the U. S. Army Corps of Engineers responsiblity for developing by 1982, a plan to "restore and repair" Lake Erie water quality. Since receiving this responsibility, the Army Corps has worked with other Federal agencies, Canadian officials, States, and numerous universities to develop a plan. Early work identified phosphorus as the element contributing to overenrichment of Lake waters. Plans were made to address significant "point" sources of phosphorus such as waste effluent from major cities. Reductions here, though, could not do the whole job. Treatment of diffuse or "nonpoint" phosphorus sources would be required if the Lake were to return to previous levels of water quality. Of these nonpoint sources, nutrient runoff from agricultural watersheds is most significent.

How, though, was the Corps, experienced as civil engineers, to address nutrient runoff and erosion control in farm areas? Their answer to this question was to ask the agricultural community for help. In November, 1978, this was done contractually through the Joint Board of Supervisors in the Honey Creek watershed.

The Honey Creek Watershed Management Program is a pilot demonstration project. Its purpose is to demonstrate on agricultural lands practices designed primarily for the purpose of improving water quality (Best Management Practices or BMP's). It is to also demonstrate approaches or ways to get practices on the ground. Finally, it is to inform people about agricultural activities - water quality relationships and how they can help develop workable ways to carry out erosion or nutrient control practices (BMP's).

With these goals in mind, the Joint Board, with help from Cooperative Extension Service, Soil Conservation Service, Agricultural Stabilization and Conservation Service and numerous farm service representatives, began working with farmers to carry out BMP's. Engineering practices such as grassed waterways and erosion control structures were planned as well as numerous plots demonstrating reduced tillage and no-till methods.

This publication reports results of 1981 tillage demonstration plots within the Honey Creek watershed. Plot histories from planting to harvest, economic data and computed soil loss estimates are reported. This publication is <u>not</u> a research document, rather a compilation of data and information gathered while working with landowners to perform tillage demonstration practices. Main efforts was "hands on" demonstrations that people could see and judge. Plot results, excluding the 3 year summary, represent data from <u>one year only</u>. Consider this fact when comparing among plots or from plot data to your own experience.

RAINFALL AND TEMPERATURE - 1981

Cool and wet weather during May delayed planting of most demonstration plots until late May or early June. Corn plots planted in early May frequently exhibited stress or stand loss with cool, wet soils impairing emergence and slowing early season crop growth.

In June, after all plots were planted, a series of large and intense storms occurred: 4" on the 9th, 3.5" on the 14th, 3" on the 22nd and 1" on the 25th were average occurrences throughout the watershed. West-central portion of the project area was hit especially hard with 13.32" of rain recorded in Eden Township, an amount equal to 9.06" above the normal for the month. These storms caused tremendous amounts of erosion in conventionally tilled portions of demonstration plots and flooding of numerous plots. Warmer than normal temperatures (+2.10° F) combined with the excessive rainfall to produce conditions suitable for crop damage by insects, nitrogen loss and dilution of field applied chemicals. In many portions of the watershed soybean fields were replanted 2 or even 3 times.

Rainfall was below normal, and temperatures above normal in July. This hot, dry weather continued with little relief until the last 2 days of August when most of the rain for the month occurred in 1 or 2 large storms. With shallow rooting and compacted or crusted soils resulting from a wet June, many crops, particularly those on fills or those lacking protective crop mulches, suffered severe moisture stress during this hot, dry period. August rains were too late to negate the impact of short term drought on crop development.

August rains did, however, lead to a cool, wet September where for most of the watershed, rainfall was 3-4" above normal and temperatures averaged nearly 2 degrees below normal. Such conditions did little to help maturation of late planted crops, especially corn, where at harvest grain moisture levels of 30% were not uncommon.

Frequently, however, corn harvest was delayed as long as possible to permit greater crop maturation in fields planted late.

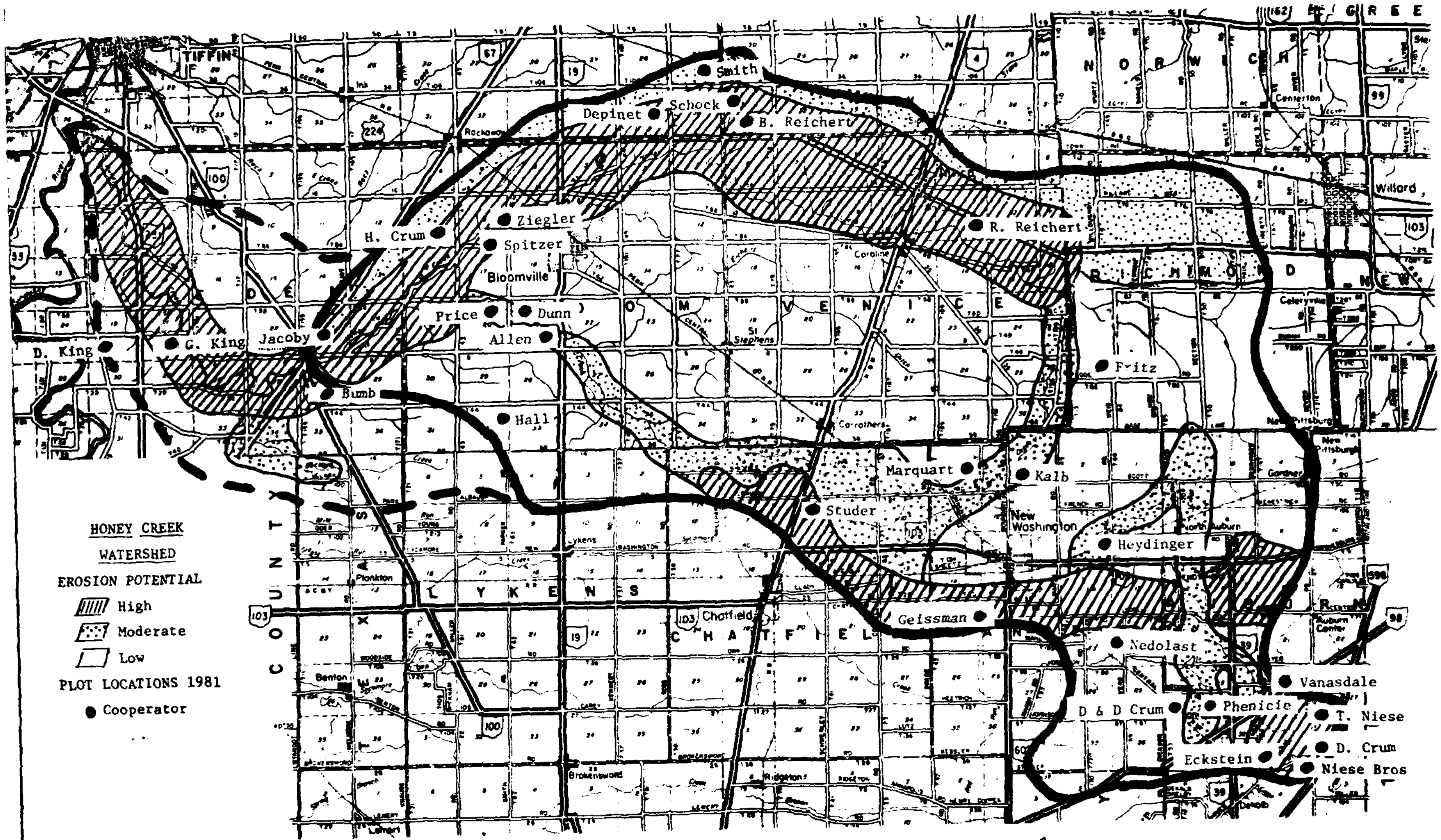
Table 1. Precipitation summary (rainfall, inches) for townships within the Honey Creek watershed, 1981.

SENECA COUNTY	May	June	July	Aug.	Sept.	Oct.	TOTAL
Bloom Township	3.46	11.67	3.29	4.15	6.01	2.29	30.87
Eden Township	3.87	13.32	3.19	5.45	6.50	2.48	34.81
Venice Township	3.21	10.26	3.41	3.67	4.92	2.12	27.59
CRAWFORD COUNTY							
Auburn Township	3.41	7.77	2.20	3.60	7.70	-	-
Chatfield Township	3.12	8.55	2.87	4.61	5.29	-	-
Cranberry Township	3.66	7.65	2.90	3.78	5.73	-	-
Lykens Township	3.41	9.29	2.41	5.93	5.72	-	-
AVERAGE	3.45	9.79	2.90	4.46	5.98	2.30	28.88
Deviation*	(-.05)	(+5.53)	(-.77)	(+1.37)	(+3.23)	(+.02)	(+9.33)

Table 2. Temperature summary (degrees Fahrenheit) for Tiffin, Ohio, 1981

TIFFIN	May	June	July	Aug.	Sept.	Oct.
1981	58.56	71.61	75.00	71.63	63.29	50.63
Deviation*	(-1.57)	(+2.10)	(+1.39)	(-.14)	(-1.61)	(-2.88)

*Deviations calculated using 30 year Environmental Science Services Administration Averages for the station of Tiffin, Ohio.


HONEY CREEK
WATERSHED
EROSION POTENTIAL
High
Moderate
Low
PLOT LOCATIONS 1981
Cooperator
TIFFIN
Smith
Depinet
Schock
B. Reichert
Ziegler
H. Crum
Spitzer
Bloomville
R. Reichert
Price
Dunn
Allen
D. King
G. King
Jacoby
Bumb
Hall
Fritz
Marquart
Kalb
Studer
New Washington
Heydinger
Geissman
Nedolast
Vanasdale
D & D Crum
Phenicie
T. Niese
D. Crum
Eckstein
Niese Bros
Willard
Chatfield
Caroline
St Stephens
Carrothers
Plankton
Benton
Brokensword
Ridgeton
North Auburn
New Pittsburg
Centerton
Celeryville
Auburn Center
Rockaway
NORWICH
RICHMOND
VENICE
LYKENS
CHATFIELD
COUNTY

PERFORMING DEMONSTRATION PLOTS

Plot Selection

During this third year of the project, plot selection was again a timely and orderly process. Tentative plot selection began in midsummer, 1980, to enable proper planning of cover crops, fall fertilization and tillage operations. Plots selected were based on county task force recommendations to demonstrate: (1) conventional tillage practices (plow systems) beside reduced and no-tillage practices, (2) several types of reduced or no-tillage side by side, (3) third year no-till after second year no-till, and (4) the planting of both corn and soybeans in a variety of crop residue situations. Potential locations for plots came from suggestions by first and second year cooperators and task force members, plus contacts made with landowners during tours or workshops held within the watershed.

Factors influencing final location were soil suitability for reduced tillage or no-till, drainage, known problem erosion areas and field histories (weed pressure, insect problems, fertility). Demonstration plots were also to be adjacent to roads and accessible for public viewing. Using these recommendations and guidelines, landowners were contacted during late summer and fall to determine fields suitable for tillage demonstrations. Subsequent field checks of these locations by project staff and Extension Service personnel led to final plot selection. See map, page .

All but four plots fell within areas identified for priority erosion control treatment, those same areas where, because of drainage and topography, chances for crop successes with reduced tillage and no-till would be greatest. As a result, plots generally reflect conditions within the watershed where reduced tillage and no-till would work well, both from the standpoint of crop yields and erosion reduction.

Planning

Where necessary, planning for cover crops, fall tillage or fall fertilization was done prior to final plot selection. After fall soil tests (Research-Extension Analytical Laboratory, O.A.R.D.C., Wooster, Ohio) and subsequent final plot selection, landowners were contacted in December to plan demonstration plot details. Recommendations were made regarding fertility, herbicide - insecticide usage, seed varieties and equipment to be used. A John Deere 7000 conservation planter leased by the Joint Board and a Moore no-till drill furnished by Chevron Chemical Co. were made available to cooperators requiring them. It was further determined exactly who was to do what job and when. For example, it may have been determined that the farmer would have herbicides custom applied following planting. If necessary, times were also set to assist landowners in planter calibration. Finally, all cooperators were asked to contact project personnel before planting so that one of them or an agency representative could be present to view planting and/or assist the planting operation. Thru all planning discussion, management steps required to insure a successful reduced tillage operation were emphasized. Extension Service representatives reviewed final recommendations to insure technical correctness. Extension personnel, farm service dealers/representatives and others with current information on reduced tillage also provided assistance during final plot planning.

Planting - Spraying

In checking the plots or upon notification from a cooperator that he was ready to plant, project or other agency personnel/staff went to a plot to assist

planting and to check seeding rates, depths and insecticides. In some cases project personnel drive planting equipment so farmers could observe proper operation of planting units. Most plots were custom sprayed after planting. To help insure proper herbicide application, local custom applicators, where possible, were informed about the plots and provided written herbicide recommendations several weeks before planting. Day to day contact with custom applicators by project staff and cooperators led to the assurance of plots getting sprayed on time with the proper herbicides and rates. Weed control results show again this year that custom applicators can do a very good job at spraying in reduced tillage and reduced tillage and no-till systems.

Monitoring

Following planting, plots were checked for emergent plant populations. Amount of past crop residues on the surface was also estimated. Throughout the growing season, insect, weed and disease conditions were checked two to three times weekly by either project staff or Extension Service representatives. Where pest problems were detected, recommendations were made to eliminate or reduce damage encountered. Near the end of the growing season, final stand populations were recorded. Photo documentation of most plots was also done.

Harvest

In order to uniformly determine net return to farmers from corn plots, yield checks were done using the method employed by Chevron Chemical Company in their state-wide (Ohio) no-till yield contest. With this method, a representative acre or more is harvested. Based on average row width, length, number of rows, corn moisture at harvest, and total weight harvested, corn yields were calculated to 15.5% moisture. Total harvest weights from demonstration plots were determined with a weigh wagon having an electronic scale with digital readout. For soybeans the method was modified to include measurements of combine header width as compared to row width for corn. Modifications were also made to calculate bean yields at 13% moisture.

NOTE: Yield checks were not completed on two demonstration plots. Flooding three times during June and subsequent replanting of the Jim and Gerry Nedolast plot resulted in stands from which representative or meaningful checks of the various tillage comparisons could not be made. Also, triazine residues from undetermined sources destroyed initial as well as replanted stands of soybeans in the Bill Reichert demonstration plot. Final stands were unsuited for meaningful yield checks. As a result, data for these two plots is not presented in this summary publication.

TABLE 4 . SOIL FERTILITY IN DEMONSTRATION PLOTS

Cooperator	Ziegler	Phenicie	Depinet	Price	Fritz
Soil type /1	Tiro SiLo	Cardington SiLo	Blount SiLo	Tiro SiLo	Bennington SiLo
pH /2	6.6	5.8 *6.0	7.4	5.5 *5.1	7.2
Lime test index /3	69	66	70	64	70
Phosphorus(P)lb/ac /4	57	67	27	112	88
Potassium(K)lb/ac /5	196	330	248	312	253
Calcium(Ca)lb/ac /6	2800	2440	3580	2260	4350
Magnesium(Mg)lb/ac /7	371	358	597	318	634
C.E.C. /8	10	13	12	15	14
Organic matter /9	2.2	2.8 *3.6	2.1	2.7 *3.3	2.9
Base saturation %Ca %Mg %K /10	70 15 2.5	48 12 3.3	76 21 2.7	39 9 2.7	79 19 2.3

Cooperator	Spitzer	Smith	Hall	Vanasdale	Studer
Soil type /1	Gallman Lo	Blount SiLo	Tiro SiLo	Tiro SiLo	Bennington SiLo
pH /2	6.7	6.7 *6.7	6.2	7.1	7.1
Lime test index /3	69	69	68	70	70
Phosphorus(P)lb/ac /4	59	64	35	51	56
Potassium(K)lb/ac /5	191	274	180	224	245
Calcium(Ca)lb/ac /6	3000	3750	2450	3970	3400
Magnesium(Mg)lb/ac /7	551	527	393	318	530
C.E.C. /8	11	13	10	12	11
Organic matter (%) /9	2.4	2.5 *3.3	2.0	1.8	2.4
Base saturation %Ca %Mg %K /10	67 20 2.2	71 17 2.7	59 16 2.2	86 11 2.5	77 20 2.8

Cooperator	Dunn	Allen	Phenicie	Don Crum	Bumb
Soil type /1	Tiro SiLo	Tiro SiLo	Bennington SiLo	Cardington SiLo	Gallman Lo
pH /2	6.7	7.3	6.4	6.4	6.7
Lime test index /3	69	70	69	68	68
Phosphorus(P)lb/ac /4	49	24	45	67	103
Potassium(K)lb/ac /5	270	210	300	282	204
Calcium(Ca)lb/ac /6	2970	2950	2630	2810	3040
Magnesium(Mg)lb/ac /7	563	666	394	319	374
C.E.C. /8	11	10	10	11	12
Organic matter (%) /9	2.5	1.9	2.2	2.8	2.2
Base saturation %Ca %Mg %K	66 21 3.1	71 27 2.6	67 17 3.9	63 12 3.3	64 13 2.2

TABLE gives the soil test values as determined by the Ohio State University Laboratory for all 1981 Honey Creek demonstration plots. Soil test samples were taken in the fall after previous crop harvest. Annual recommendations from the Laboratory, previous and expected crop yields, and present fertility buildup programs were used to determine the amount of nutrients to be applied.

/1 Predominant soil type of 5-15 acre plots: Si = silt, Cl = clay, Lo = loam. All soil tests were taken 8-9" deep.

/2 Soil pH test measures active soil acidity. Recommended range for corn and soybeans is 6.0 to 7.0. *Represents a pH test at 1-2" depth.

/3 Used to determine lime requirement. The lower the lime test is below 68, the higher the lime requirement.

/4 Recommended range for phosphorus (Bray P1) is 40#/acre for corn and soybeans.

TABLE 4 . SOIL FERTILITY IN DEMONSTRATION PLOTS

NieseBros.	Geissman	Kalb	H. Crum	Jacoby	Don Crum
Cardington SiLo	Tiro SiLo	Bennington SiLo	Blount SiLo	Blount SiLo	Bennington SiLo
7.1	7.0	7.3	5.4	6.7	6.2
70	70	70	66	68	67
58	26	31	32	43	55
318	225	278	220	223	250
4480	2800	3550	2840	3350	3350
393	459	489	442	510	353
13	9	11	14	13	14
2.6	2.4	2.8	2.4	2.2	2.9
85 12 3.1	76 21 3.1	79 18 3.2	51 13 2.0	64 16 2.2	61 11 2.3

Eckstein	G. King	Heydinger	D. King	DonaldCrum	Schock
Bennington SiLo	Haskins Lo	Bennington SiLo	Blount SiLo	Lenawee SiClLo	Blount SiLo
6.2	7.4	7.2	6.8	7.3	7.4
68	70	70	70	70	70
33	72	66	32	29	58
168	303	217	241	213	165
3210	5100	3450	3230	5500	3240
395	772	599	496	710	696
12	16	11	10	17	11
2.3	2.8	1.9	2.3	4.2	1.8
65 13 1.8	78 20 2.4	76 22 2.4	77 20 3.0	81 17 1.6	72 26 1.9

Marquart	R.Reichert	Tom Niese
Tiro SiLo	Blount SiLo	Bennington SiLo
6.4	7.1	6.9
68	70	70
51	51	35
267	320	204
2750	3500	4410
447	596	454
11	12	13
2.6	2.5	2.6
60 16 3.0	75 21 3.5	84 14 2.0

/5 Recommended range for potash is 250-420 lb/ac depending on C.E.C. and crop.

/6 If soil pH is maintained at adequate levels, calcium deficiencies seldom occur.

/7 The pounds per acre of magnesium should be at least two times the soil test (K) potassium levels and at least 8% of base saturation.

/8 C.E.C. - cation exchange capacity.

/9 *Represents surface organic matter test at 1-2" depth.

/10 Base saturation is the percentage of C.E.C. occupied by calcium, magnesium and potassium.

TILLAGE PLOTS ECONOMICS - GUIDELINES FOR COMPARISON

During 1981 tillage demonstrations, cooperators reported quantities of fertilizer, herbicides and insecticides used per acre, and noted the number and type of operations across their plots. Tables 5 and 6 show 1981 spring unit prices of materials and machine custom rate charges used in determining production costs. The $2.35 base price for corn was determined by checking local elevators during the busiest week at harvest time and averaging the current market price at that time. The $6.25 base price for soybeans was determined in the same manner. Crop value for corn was calculated by taking yields at 15.5% moisture, multiplying by the base price ($2.35), minus the wet bushels produced per acre times the drying charges (local elevator schedule). Crop value for soybeans was calcuted by taking yields at 13.0% moisture, multiplying by the base price ($6.25), minus wet bushels produced per acre times the drying charges (local elevator schedule). Return to land and management was then calculated as the difference between crop value and production costs. Pages 16 to 75 provide detailed explanation and breakdown of calculations for all tillage plots.

Guidelines

1. In 1981 there was again a greater emphasis to compare different tillage systems with one another. There were 28 no-till plots, 12 reduced tillage, and 12 conventional plots in corn, while there were 9 no-till soybean plots, 2 reduced tillage, and 7 conventional plots in soybeans. There were more no-till plots with corn and soybeans in order to put emphasis in certain areas on the conservation practice itself rather than comparisons with other tillage systems. We hope individual plot details sheets are read before conclusions are made from looking at total plot averages. This year's work shows a bright future for conservation tillage in this area. What has been learned this year has given us a head start for better production with conservation tillage in the future.

2. Land costs are omitted. These costs include interest, depreciation on land improvements, and property taxes. While important costs, they are the same regardless of the tillage method used or the crop grown, thus they are omitted from the analysis.

3. Material costs for corn and soybeans plots varied both within and among tillage categories, no-till, reduced till, and conventional. (Tables 7 and 8.) Variations are attributed to yield goals, buildup of residual fertility, previous crops, and amounts of growing vegetation present at planting time (reduced till and no-till plots). As noted in the individual economic analyses, growing vegetation within some reduced or no-till plots requires additional expense for a contact herbicide ($5-$11/A) and surfactant ($.40-$1.20/A). Rates of residual herbicides were about the same except slightly higher rates were generally used to insure control under heavy residue conditions. In summary, material costs were somewhat higher in no-till and reduced till plots because of the addition of a contact herbicide and added insecticides for armyworm control. No-till corn was $23.64 higher than conventional, and reduced till corn had $8.92 more material cost than the conventional corn plots. Material costs for all soybean tillage systems were similar, about $110 per acre. Pest management is a very useful tool for eliminating costly preventive measures for possible insect infestation.

4. Machine costs for plots within a given tillage category were fairly consistent (Tables 7 and 8). Conventional corn tillage plots had $19.98 more machine

cost than no-till corn plots, and reduced till corn plots had $12.66 more machine cost than the no-till plots. In the soybean tillage plots, similar relationships with machine costs could be seen.

5. Savings in machine costs were more than enough to eliminate any extra cost of materials needed in the reduced or no-till corn and soybean plots.

6. No costs were given for the establishment of rye or other cover crops which would be necessary in a corn-soybean rotation on steep slopes where soybean residue isn't enough to hole back sheet and rill erosion. This cost would average $6-$12 for seed and $3-$6 for tillage, aerial application and/or other mechanical seeding of the cover crop.

7. Nitrogen costs vary according to form in which N is applied.

8. The schedule of custom rates may differ from those in your area. The costs of owning and operating your own equipment may differ somewhat. Machine custom rates include overhead costs, machine operating costs, machine replacement, repairs, fuel, and time for the operator.

9. Timeliness of operation is not considered in any of the economic comparisons. Reduced tillage systems and no-till as shown in Tables 7 and 8 may enhance the timeliness of field operations. Research has shown corn yields are reduced one bushel per acre per day planting occurs after May 10th. As a general rule, soybean yields will be reduced 1/3 to 1/2 bushel per acre per day planting is delayed after the 10th of May. Thus, reduced and no-till systems with their lower field time requirements may improve the timeliness and increase yields for your operations.

10. Cost of insecticides were about the same for no-till, reduced and conventilnal tillage. Most corn plots received seed treater and all corn plots planted to second-year corn received rootworm control materials. Increased use of inecticides came from the use of preventive armyworm insecticide (Furadan) which did not hold down infestation of armyworms in the rye cover crops. This led to an extra trip across the field when economic thresholds were reached, with an application of toxaphene to control the armyworms.

11. Cost for soil loss is not included but needs important consideration. Soil loss may be a significant economic loss in your farm operation particularly as it affects future productivity. Also this soil loss may impose costs on others as sediment is deposited in drainage ditches, streams and harbors.

12. Yields will still be a main factor in determining profitability of different conservation tillage systems. Some yield may be sacrificed if it is covered by decreased costs in putting out the crop and/or if some value is put on possible soil loss. With any tillage system, experience and years of practice with different growing seasons will enable more reliable comparison of results and conclusions on your farm.

TABLE 5. UNIT PRICES OF MATERIALS

Fertilizer:

Anhydrous ammonia (82%)	$263/ton or	16¢/lb. actual N
Nitrogen solution (28%)	$135/ton or	24¢ lb. actual N
Urea (46%)	$221/ton or	24¢/lb. actual N
0-46-0	$221/ton or	24¢/lb. actual P_2O_5
0-0-60	$150/ton or	12½¢/lb. actual K_2O
18-46-0	$260/ton	
7-21-32	$214/ton	
6-24-24	$191/ton	
10-26-26	$211/ton	
14-21-9+1z+10s	$245/ton	
8-32-16	$240/ton	
11-40-11	$285/ton	
9-23-30	$204/ton	
6-15-40	$185/ton	
10-34-0	$280/ton	
11-33-11+3s	$268/ton	
6-18-6	$185/ton	
8-25-3	$204/ton	
9-29-19+1z+.1Fe+1s+.5Mg+1Ca	$270/ton	
9-27-3+2s	$265/ton	
9-27-3	$236/ton	
0-0-60+20Mn	$304/ton	
0-0-22+11.2Mg+22.7s	$140/ton	
3-18-18	$3.55/gal.	
3-9-27	$169/ton	
5-0-30	$128/ton	
14-35-15	$270/ton	
/1 Seed, lime, misc.	$40/acre	

/1 Includes supplies, utilities, soil and plant analysis, small tools, crop insurance, etc.

Herbicide:

Roundup	$68.00/gal.	Dual 8E	$44.00/gal.
Paraquat CL	$43.00/gal.	Lexone DF	$16.00/lb.
X-77 spreader	$13.00/gal.	Lexone-Sencor 4L	$80.00/gal.
Atrazine 4L	$12.00/gal.	Lorox 50W	$4.80/lb.
Princep 4L	$19.00/gal.	Banvel D	$40.00/gal.
Bladex 4L	$16.00/gal.	Blazer 2S	$75.00/gal.
Lasso 4E	$18.00/gal.	2,4-D amine	$12.00/gal.
		Crop oil	$8.00/gal.

Insecticide and misc.:

N-Serve 24	$24.50/gal.
Isotox seedtreater "D" and "F"	$.70/acre
Toxaphene 6E	$11.00/gal.
Furadan 10G	$.90/lb.
Counter 15G	$1.35/lb.
Amaze 20G	$1.90/lb.
Dyfonate 20G	$1.55/lb.
Kalo Triple-Noctin L	$2.50/acre
Bacterial innoculants	$.50/acre

NOTE: Your price will vary according to season, financing, location and discounts.

TABLE 6. MACHINE CUSTOM RATES

OPERATION	IMPLEMENT	CUSTOM RATE
Primary tillage	Moldboard plow	$11.00/acre
	Coultered chisel	8.25
	Chisel plow	8.25
	Offset disc	8.25
Secondary tillage	Field cultivator	6.00
	Tandem disc	5.50
	Harrogator/packer	5.00
	Cultimulcher	4.50
Planting or drilling /1	No-till	11.00
	Conventional	8.00
Apply anhydrous ammonia		6.00
Rotary hoeing		2.50
Cultivate row crops		4.50
Spray liquids		3.00
Spread dry fertilizer		3.00
Aerial application		5.00
Harvest corn		19.50
Harvest soybeans		17.50
Truck grain (300+ bu. loads)(10+miles)		.09/bu.

/1 If no-till planter was used in a plot where a conventional planter would have worked, the conventional rate was used. In doubling back to get narrower rows for soybeans, $16.50 was used for no-till and $12.00 for conventional.

28% applicators make an easy job of side-dressing additional nitrogen.

TABLE 7. ECONOMIC SUMMARY (CORN)

NO-TILL

Cooperator	Ziegler	Phenicie	Phenicie	Depinet	Price	Price	Fritz
Material costs	$204.44	$236.25	$236.45	$196.40	$255.70	$255.70	$149.12
Machine costs	49.86	48.70	48.54	53.37	48.73	49.33	55.52
Total costs	$254.80	$284.95	$284.79	$249.77	$304.43	$305.03	$204.64
Return (net)	$ 40.03	$-76.80	$-89.81	$-84.33	$-33.78	$-14.81	$ 35.79
Yield bu/ac	136.2	95.1	91.1	92.5	125.0	132.6	121.4
Cooperator	Spitzer	Smith	Smith	Hall	Vanasdale	Vanasdale	Studer
Material costs	$228.67	$225.17	$219.22	$238.69	$232.36	$232.36	$229.15
Machine costs	52.80	43.71	46.11	45.32	59.04	60.67	61.30
Total costs	$281.47	$268.88	$265.33	$284.01	$291.40	$293.03	$290.45
Return (net)	$-31.62	$-185.87	$-60.15	$-126.47	$-42.20	$-37.45	$ 3.52
Yield bu/ac	115.4	40.5	96.4	80.8	125.9	135.3	147.4

REDUCED TILL

Cooperator	Ziegler	Depinet	Niese Br.	Kalb	Jacoby	Hall	Vanasdale
Material costs	$197.45	$189.81	$215.14	$163.82	$181.96	$225.85	$215.08
Machine costs	62.15	61.77	64.32	73.27	54.04	60.49	66.86
Total costs	$259.60	$251.58	$279.46	$237.09	$236.00	$286.34	$281.94
Return (net)	$ 70.63	$-82.48	$-119.14	$ -8.06	$-17.56	$-47.43	$-32.79
Yield bu/ac	152.5	95.4	92.3	125.6	96.8	119.6	124.0

CONVENTIONAL

Cooperator	Ziegler	Fritz	Fritz	Geissman	Kalb	Spitzer	Smith
Material costs	$197.45	$138.20	$175.98	$199.49	$163.82	$221.87	$212.33
Machine costs	64.05	72.19	72.07	71.00	75.81	70.23	70.45
Total costs	$261.50	$210.39	$248.05	$270.49	$239.63	$292.10	$282.78
Return (net)	$ 52.16	$ 56.05	$ 19.24	$-108.24	$ -2.07	$-55.43	$-32.61
Yield bu/ac	144.1	135.6	135.1	89.9	126.8	107.0	116.2

NOTE: Summary of production costs and yields are taken from pages 16 to 75. See individual, economic analysis pages for detailed explanation of cost differences. Material Costs include seed, lime, miscellaneous, fertilizer, herbicides, and interest on operating capital. Machine Costs include custom rates for tillage, planting, harvesting, trucking, application of fertilizers, herbicides and insecticides.

TABLE 7. ECONOMIC SUMMARY (CORN)

NO-TILL

Fritz	NieseB.	Geissman	Geissman	Kalb	H. Crum	Jacoby	D. Crum	
$186.90	$233.33	$216.32	$211.99	$181.95	$219.65	$191.44	$186.75	
55.85	55.79	55.29	56.87	59.32	50.81	51.95	48.61	
$242.75	$289.12	$271.61	$268.86	$241.27	$270.46	$243.39	$235.36	
$ 5.57	$-135.67	$-115.38	$-68.10	$-27.30	$-104.71	$-14.32	$ 20.01	
124.6	86.7	85.0	103.7	118.5	94.6	101.5	120.7	

Eckstein	G. King	Heydinger	D. King	D/D Crum	Schock		Average
$193.57	$215.45	$207.48	$220.87	$198.77	$212.33	. . . . .	$214.88
53.01	41.78	50.59	46.42	48.80	57.14	. . . . .	51.97
$246.58	$257.23	$258.07	$267.29	$247.57	$269.47	. . . . .	$266.85
$-108.40	$-154.64	$-77.00	$-84.55	$-68.51	$ .39	. . . . .	$-58.44
69.8	50.4	97.5	92.3	88.5	136.3	. . . . .	103.8

REDUCED TILL

Vanasdale	Studer	G. King	[illegible]	D. King		Average
$215.08	$209.67	$196.95	[illegible]	$202.31	. . . . .	$200.16
69.01	72.59	59.77	[illegible]	65.12	. . . . .	64.63
$284.09	$282.26	$256.72	[illegible]	$267.43	. . . . .	$264.79
$-35.29	$ 21.87	$-130.[illegible]	$-62.23	$-30.87	. . . . .	$-39.46
134.0	152.6	62.2	108.9	114.7	. . . . .	114.8

CONVENTIONAL

Hall	Studer	Eckstein	Heydinger	D/D Crum		Average
$225.85	$209.67	$175.23	$188.80	$186.26	. . . . .	$191.24
67.27	74.50	82.55	68.54	74.70	. . . . .	71.95
$293.12	$284.17	$257.78	$257.34	$260.96	. . . . .	$263.19
$-108.49	$ 10.95	$-68.70	$-35.12	$-65.44	. . . . .	$-28.14
96.9	148.3	92.2	119.1	91.9	. . . . .	116.9

NOTE: Summary of production costs and yields are taken from pages 16 to 75. See individual, economic analysis pages for detailed explanation of cost differences. Material Costs include seed, lime, miscellaneous, fertilizer, herbicides, and interest on operating capital. Machine Costs include custom rates for tillage, planting, harvesting, trucking, application of fertilizers, herbicides and insecticides.

No-till planter demonstrations and tours of demonstration plots were activities providing farmers opportunities to learn more about conservation tillage. Here farmers observe a planter demonstration at the Bob Gray farm, Huron County (above), and view no-till corn on the Tom Depinet farm, Seneca County (below).

TABLE 8. ECONOMIC SUMMARY (SOYBEANS)

NO-TILL

Cooperator	Dunn	Allen/1	Phenicie	Phenicie	D. Crum	
Material costs	$ 99.98	$108.69	$116.65	$116.65	$ 94.52	
Machine costs	38.76	35.93	38.98	38.32	38.23	
Total costs	$138.74	$144.62	$155.63	$154.97	$132.75	
Return (net)	$145.92	$-45.40	$155.62	$110.03	$123.30	
Yield bu/ac	46.0	15.9	49.8	42.4	41.1	

Cooperator	Bumb	Marquart	Reichert	Niese		Average
Material costs	$ 93.80	$ 89.78	$ 90.69	$191.67/2	. . . . .	$111.72
Machine costs	40.79	39.04	43.80	47.02	. . . . .	40.62
Total costs	$134.59	$128.82	$134.49	$238.69	. . . . .	$152.34
Return (net)	$ 84.36	$183.29	$125.92	$ 4.04	. . . . .	$116.56
Yield bu/ac	35.5	50.1	41.8	38.9	. . . . .	43.2

REDUCED

Cooperator	Phenicie	Phenicie		Average
Material costs	$107.59	$107.59	. . . . .	$107.59
Machine costs	50.02	46.88	. . . . .	48.45
Total costs	$157.61	$154.47	. . . . .	$156.04
Return (net)	$138.64	$114.91	. . . . .	$126.78
Yield bu/ac	47.4	43.1	. . . . .	45.2

CONVENTIONAL

Cooperator	Allen/1	Phenicie	Bumb	Marquart	Reichert	
Material costs	$ 94.75	$107.59	$ 79.72	$ 77.84	$ 78.75	
Machine costs	64.63	58.65	57.27	59.35	68.04	
Total costs	$159.18	$166.24	$136.99	$137.19	$146.79	
Return (net)	$-27.11	$121.88	$115.21	$196.11	$ 97.20	
Yield bu/ac	21.2	46.1	41.1	53.3	39.1	

Cooperator	Niese	Niese		Average
Material costs	$165.53/2	$171.29/2	. . . . .	$113.45
Machine costs	63.98	62.67	. . . . .	61.66
Total costs	$229.51	$233.96	. . . . .	$175.11
Return (net)	$ 12.37	$ 21.04	. . . . .	$ 93.97
Yield bu/ac	38.7	40.8	. . . . .	43.2

/1 Data excluded from summary averages.
/2 Roundup used for control of perennial weeds, additional fertilizer applied to increase field fertility.

NOTE: Summary of production costs and yields are taken from pages 16 to 75. See individual economic analysis pages for detailed explanation of cost differences. Material Costs include seed, lime, miscellaneous, fertilizer, herbicides and interest on operation capital. Machinery Costs include custom rates for tillage, planting, harvesting, trucking and application of fertilizers, herbicides and insecticides.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Paul and Carl Ziegler, 6661 East County Road 12, Bloomville, Ohio 44818

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	24,300	22.5	136.2	$294.83	$254.80	$ 40.03
2	Fall chisel	Corn	24,800	22.2	152.5	330.23	259.60	70.63
3	Fall plow	Corn	22,800	22.0	144.1	313.66	261.50	52.16

TILLAGE

1 Planted with John Deere 7000 conservation planter.
2 Fall chisel, disc with cultipacker, planted with same planter.
3 Fall plow, disc with cultipacker, planted with same planter.

PLOT NO.	1	2	3
Tillage treatment	No-till	Fall chisel	Fall plow
TOTAL VALUE	$294.83	$330.23	$313.66
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00
Fertilizer:			
Broadcast 500# 5-0-30	32.00	32.00	32.00
Starter 250# 11-33-11+3S	33.50	33.50	33.50
Nitrogen applied as 28-0-0	45.64	45.64	45.64
Chemicals:			
Herbicides	25.48	18.55	18.55
Insecticides	12.85	12.85	12.85
Interest: 7 months @ 14%	15.47	14.91	14.91
TOTAL VARIABLE COSTS	$204.94	$197.45	$197.45
Machinery (custom rates)			
Primary tillage	$ -	$ 8.25	$ 11.00
Secondary tillage	-	5.50	5.50
Planting	11.00	8.00	8.00
Cultivation	-	-	-
Spraying, spread fertilizer	6.00	6.00	6.00
Apply ammonia	-	-	-
Harvest	19.50	19.50	19.50
Trucking	13.36	14.90	14.05
TOTAL MACHINERY COSTS	$ 44.86	$ 62.15	$ 64.05
TOTAL COSTS	$254.80	$259.60	$261.50
RETURN TO LAND, MANAGEMENT	$ 40.03	$ 70.63	$ 52.16

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Paul and Carl Ziegler, 6661 East County Road 12, Bloomville, Ohio 44818

PLOT DETAILS:

Planted DeKalb XL55A in three plots on May 4 in 30-inch rows. 13.5# Furadan 10G was banded over the row and seed was treated with Isotox "D". Intended seed drop was 29,900 of which 25,100 plants emerged in Plot 1, 25,250 plants in Plot 2 and 26,400 plants emerged in Plot 3. Soil present is Tiro silt loam. No tile drainage present, natural drainage in this field is good. 1980 crop was corn with tillage comparisons corresponding to those of the 1981 tillage demonstration. In spring, 500# 5-0-30 was broadcast. At planting, 250# 11-33-11+3S was applied as a row starter. As 28% solution, 190# N was applied with herbicides for a total $N-P_2O_5-K_2O$ as follows: 242-82-178. Just after planting, 1.1 pt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 1.6 qt. Aatrex 4L and 2.5 pt. Dual 8E were applied to Plot 1 using 63 gallons per acre 28% as carrier. Plots 2 and 3 were sprayed similarly but without Paraquat. On June 26, infestation of Plots 2 and 3 by first brood European corn borer was recorded. By July 7 over 80% of the plants in Plot 3 showed damage with live larvae present, about 50% of Plot 2 plants showed damage and damage was minor in Plot 1. No treatment was made. Grass and broadleaf control was excellent. Harvested November 6.

Good natural drainage was a key factor this year in maintaining yields, especially no-till yields. In many cases, reduced tillage options like chiseling resulted in highest yields by combining the benefits of both crop residues and tillage.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Don Phenicie, 5661 Stevens Road, New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1A	No-till	Corn	23,600	21.4	95.1	$208.15	$284.95	$-76.80
1B	No-till	Corn	21,300	23.4	91.1	194.98	284.79	-89.91

TILLAGE

1A Planted Pioneer 3780 with Allis Chalmers 333 no-till air planter.
1B Planted Migro 2022X with same planter.

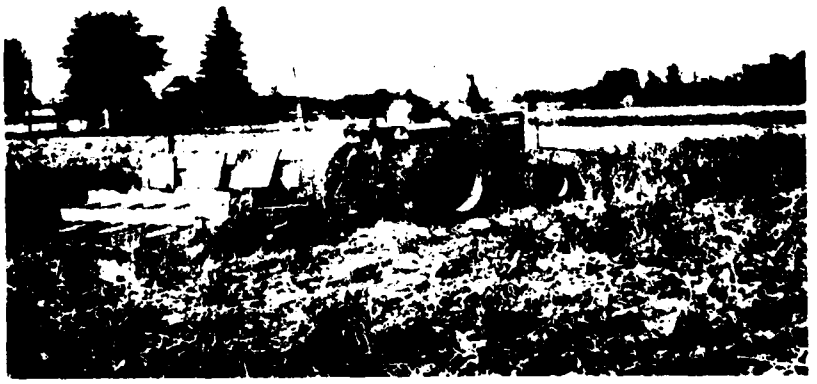
PLOT NO.	1A	1B
Tillage treatment	No-till	No-till
TOTAL VALUE	$208.15	$194.98
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast (200# 0-44-0	22.10	22.10
Broadcast (300# 0-0-60	22.50	22.50
Starter 225# 14-21-9+1Z+10S	27.56	27.56
Nitrogen applied as 28-0-0	53.28	53.28
Chemicals:		
Herbicides	40.12	40.12
Insecticides	12.85	12.85
Interest: 7 months @ 14%	17.84	17.84
TOTAL VARIABLE COSTS	$236.25	$236.25
Machinery (custom rates)		
Primary tillage	$ -	$ -
Secondary tillage	-	-
Planting	11.00	11.00
Cultivation	-	-
Spraying, spread fertilizer	9.00	9.00
Apply ammonia	-	-
Harvest	19.50	19.50
Trucking	9.20	9.04
TOTAL MACHINERY COSTS	$ 48.70	$ 48.54
TOTAL COSTS	$284.95	$284.79
RETURN TO LAND, MANAGEMENT	$-76.80	$-89.81

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Don Phenicie, 5661 Stevens Road, New Washington, Ohio 44854

PLOT DETAILS:

Planted Pioneer 3780 and Migro 2022X in the same plot on May 21 in 30-inch rows. 13.5# Furadan 10G was applied in the furrow and seed was treated with Isotox "D". Intended seed drop was 31,000 of which 30,800 Pioneer plants emerged and 25,500 Migro plants emerged. Soils present are Bennington and Cardington silt loams. Tile drainage is systematic. 1979 and 1980 crops were both no-till corn. A rye cover crop was seeded but only grew well in one corner of the plot (about 25% of the field). Rye stood about 20-30 inches tall in this area at planting. In fall, 200# 0-44-0 and 300# 0-0-60 were broadcast. At planting, 225# 14-21-9+1Zn+10S was applied as a row starter. As 28% solution, 150# was applied with herbicides and 72# was dribbled between the rows on July 1 for a total N-P_2O_5-K_2O as follows: 254-135-200. Just after planting, 1.5 pt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 2 qt. Princep 4L, 2 qt. Bladex 4L and 2.5 pt. Dual 8E were applied using 50 gallons per acre 28% as carrier. Broadleaf control was excellent. Grass control was good with some fall panicum and foxtail present. In early June, the crop suffered some damage from slugs and common stalk borer. On June 14, the rye portion of the field was sprayed with 2 qt. Toxaphene 6E for armyworm control. Harvested November 4.



After three years of continuous no-till corn, Don Phenicie felt that yields may have been improved by using a crop rotation.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Tom Depinet, 9928 East Township Road 106, Bloomville, Ohio 44818

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	21,200	35.3	92.5	$165.44	$249.77	$-84.33
2	Fall tandem-disc	Corn	21,000	35.6	95.4	169.10	251.58	-82.48

TILLAGE

1 Planted with John Deere 7000 conservation planter.
2 Fall tandem disc, spring tandem disc, planted with same planter.

PLOT NO.	1	2
Tillage treatment	No-till	Fall tandem disc
TOTAL VALUE	$165.44	$169.10
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast (100# 0-44-0	11.05	11.05
Broadcast (200# 0-0-60	15.00	15.00
Starter 250# 8-32-16	30.00	30.00
Nitrogen applied as 28-0-0	21.60	21.60
Nitrogen applied as 82-0-0	24.00	24.00
Chemicals:		
Herbicides	28.84	22.75
Insecticides	11.08	11.08
Interest: 7 months @ 14%	14.83	14.33
TOTAL VARIABLE COSTS	$196.40	$189.81
Machinery (custom rates)		
Primary tillage	$ -	$ 5.50
Secondary tillage	-	5.50
Planting	11.00	8.00
Cultivation	-	-
Spraying, spread fertilizer	6.00	6.00
Apply ammonia	6.00	6.00
Harvest	19.50	19.50
Trucking	10.87	11.27
TOTAL MACHINERY COSTS	$ 53.37	$ 61.77
TOTAL COSTS	$249.77	$251.58
RETURN TO LAND, MANAGEMENT	$-84.33	$-82.48

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Tom Depinet, 9928 East Township Road 106, Bloomville, Ohio

PLOT DETAILS:

Planted Sohigro 39 in two plots on May 22 in 30-inch rows. 6.7# Dyfonate 20G was banded over the row and seed was treated with Isotox "D". Intended seed drop was 29,900 of which 24,550 plants emerged in Plot 1 and 25,750 plants emerged in Plot 2. Soils present are Morley and Blount silt loams. Tile drainage is systematic. 1980 crop was corn with tillage comparison corresponding to those of the 1981 tillage demonstration. In spring, 200# 0-0-60 and 100# 0-44-0 were broadcast. At planting, 250# 8-32-16 was applied as a row starter. Just after planting, 90# N was applied as 28% solution. Then on July 27, 150# N was side dressed as anhydrous ammonia for a total N-P_2O_5-K_2O as follows: 260-124-160. Too high a yield goal may have been chosen considering soil fertility and field history. With the 28% solution (30 gallons) plus 30 gallons of water as carrier (60 gallons total), 1 pt. Paraquat CL with 12 oz. X-77 spreader per 100 gallons carrier, 1 qt. Aatrex 4L, 1.5 qt. Bladex 4L and 2.5 pt. Dual 8E were applied to Plot 1. Plot 2 was sprayed similarly but without Paraquat. Grass and broadleaf control was excellent in both plots. Based on observation of changes in plant color (pale to dark green) and growth rate, corn response to side dress application appeared favorable and significant. No insect problems. Harvested October 23.

Applying most of his nitrogen in July as side-dressed anhydrous ammonia helped Tom Depinet maintain yield this year where June rains and resulting wet soils often caused significant loss of nitrogen applied earlier in the year.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Paul Price, 6326 South Township Road 173, Bloomville, Ohio 44818

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1A	No-till	Corn	24,800	22.3	125.0	$270.65	$304.43	$ -33.78
1B	No-till	Corn	22,300	21.4	132.6	290.22	305.03	-14.81

TILLAGE

1A Planted Funks 4315 with Allis Chalmers 333 no-till plate planter.
1B Planted Funks 4323 with same planter.

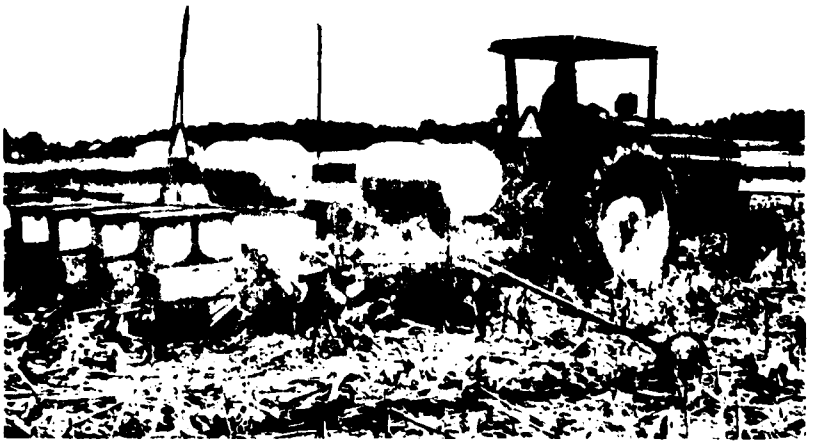
PLOT NO.	1A	1B
Tillage treatment	No-till	No-till
TOTAL VALUE	$270.65	$290.22
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast: 730# 3-9-27	61.68	61.68
Starter: 25G 9-27-3+2S	37.10	37.10
Nitrogen applied as 28-0-0	52.87	52.87
Chemicals:		
Herbicides	33.97	33.97
Insecticides	10.78	10.78
Interest: 7 months @ 14%	19.30	19.30
TOTAL VARIABLE COSTS	$255.70	$255.70
Machinery (custom rates)		
Primary tillage	$ -	$ -
Secondary tillage	-	-
Planting	11.00	11.00
Cultivation	-	-
Spraying, spread fertilizer	6.00	6.00
Apply ammonia	-	-
Harvest	19.50	19.50
Trucking	12.23	12.83
TOTAL MACHINERY COSTS	$ 48.73	$ 49.33
TOTAL COSTS	$304.43	$305.03
RETURN TO LAND, MANAGEMENT	$-33.78	$-14.81

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Paul Price, 6326 South Township Road 173, Bloomville, Ohio 44818

PLOT DETAILS:

Planted Funks 4315 and Funks 4323 in the same plot on May 20 in 30-inch rows. 6.5# Dyfonate 20G was banded over the row and seed was treated with Isotox "D". Intended seed drop was 28,900 of which 25,900 Funks 4315 plants emerged and 24,850 Funks 4323 plants emerged in the Tiro, Randolph and Channahon silt loam soils. No tile drainage present. Natural soil drainage in most of the field is good. 1979 and 1980 crops were both no-till corn. In fall, lime was spread at the rate of 3 tons/acre. In spring, 730# 3-9-27 was broadcast. Note: 730# rate higher than recommended based on soil test. At planting 25 gallons 9-27-3+2S was applied as a row starter. As 28% solution 220# N was applied with herbicides for a total N-P_2O_5-K_2O of: 269-143-208. Just after planting, 1.2 pt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 1.2 qt. Aatrex 4L, 2.1 qt. Bladex 4L and 2.6 pt. Dual 8E were applied using 73.5 gallons per acre 28% as carrier. Excellent grass and broadleaf weed control. Root and stalk lodging present in 4323, severe enough in places to lower yield. Standing water two times during June in portions of the 4315 stand undoubtedly suppressed yield of this variety to some degree. Harvested November 10.



Paul Price found during the past three years that key factors in maintaining no-till yields in continuous corn are good field drainage, high soil fertility, and proper use and selection of rootworm insecticides.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Mark Fritz, Rt. 2, Box 72, Attica, Ohio 44807

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1B	No-till	Corn	20,600	29.1	121.4	$240.43	$204.64	$ 35.79
1D	No-till	Corn	20,600	29.0	124.6	248.32	242.75	5.57
2B	Fall plow	Corn	23,700	29.8	135.6	266.44	210.39	56.05
2D	Fall plow	Corn	23,700	29.5	135.1	267.29	248.05	19.24

TILLAGE

1B Planted with Allis Chalmers 333 no-till air planter.
1D Planted with same planter.
2B Fall plow, spring tandem disc and drag, planted with same planter.
2D Fall plow, spring tandem disc and drag, planted with same planter.

PLOT NO.	1B	1D	2B	2D
Tillage treatment	No-till	No-till	Fall plow	Fall plow
TOTAL VALUE	$240.43	$248.32	$266.44	$267.29
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00	$ 40.00
Fertilizer:				
Broadcast: 200# 0-0-60	15.00	15.00	15.00	15.00
Broadcast: 100# 0-44-0	-	11.05	-	11.05
Starter: 250# 6-24-24	-	23.88	-	23.88
Nitrogen applied as 28-0-0	28.84	28.84	28.84	28.84
Nitrogen applied as 82-0-0	12.83	12.83	12.83	12.83
Chemicals:				
Herbicides	28.34	28.34	18.25	18.25
Insecticides	12.85	12.85	12.85	12.85
Interest: 7 months @ 14%	11.26	14.11	10.43	13.28
TOTAL VARIABLE COSTS	$149.12	$186.90	$138.20	$175.98
Machinery (custom rates)				
Primary tillage	$ -	$ -	$ 11.00	$ 11.00
Secondary tillage	-	-	7.00	7.00
Planting	11.00	11.00	8.00	8.00
Cultivation	-	-	-	-
Spraying, spread fertilizer	6.00	6.00	6.00	6.00
Apply ammonia	6.00	6.00	6.00	6.00
Harvest	19.50	19.50	19.50	19.50
Trucking	13.02	13.35	14.69	14.57
TOTAL MACHINERY COSTS	$ 55.52	$ 55.85	$ 72.19	$ 72.07
TOTAL COSTS	$204.64	$242.75	$210.39	$248.05
RETURN TO LAND, MANAGEMENT	$ 35.79	$ 5.57	$ 56.05	$ 19.24

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Mark Fritz, Rt. 2, Box 72, Attica, Ohio 44807

PLOT DETAILS:

Planted Cargill 921 in two plots on May 22 in 30-inch rows. 13.5# Furadan 10G was applied in the furrow and seed was treated with Isotox "D". Intended seed drop was 25,100 of which 22,000 plants emerged in Plot 1, and 24,750 plants emerged in Plot 2. Soils present are Bennington and Cardington silt loams. Tile drainage is random, only in lows. 1980 crop was corn with tillage comparisons corresponding to those in the 1981 tillage demonstrations. In fall, 200# 0-0-60 was broadcast on both plots. As well, 100# 0-44-0 was fall broadcast on one-half of each plot. On half portions of each half plot, 250# 6-24-24 was applied as a row starter (see chart below). As 28% solution, 120# N was applied with herbicides. Then on July 2, 80# N was side dressed as anhydrous ammonia for a total N per plot (excluding 15# with starter) of 200. With the 28% solution (40 gallons) plus 10 gallons of water as carrier (50 gallons total), 1 pt. Paraquat CL with 14 oz. X-77 spreader per 100 gallons carrier, 1.5 pt. Aatrex 4L, 1 qt. Bladex 4L and 2.5 pt. Dual 8E were applied to Plot 1 just after planting. Plot 2 was sprayed similarly but without Paraquat and without Bladex. Excellent grass and broadleaf control. No insect problems. Minor root lodging. Harvested November 11.

Fertility trials indicate that for fields of high phosphorus fertility (see Table), phosphorus additions, broadcast or as starter, do not improve crop yields in either no-till (Plow 1) or fall plow (Plot 2) systems.

Phosphorus-Potash Fertility Trials	Application Rates #N	#P_2O_5	#K_2O	Yield, bu/ac(15.5%) Plot 1	Plot 2
A. K broadcast, no P broadcast, with starter	15	60	180	123.8	138.3
B. K broadcast, no P broadcast, no starter	0	0	120	121.4	135.6
C. K broadcast, P broadcast, no starter	0	44	120	114.3*	137.9
D. K broadcast, P broadcast, with starter	15	104	180	124.6	135.1

*Cooperator and staff felt wet spot reduced yield in this trial and that yield should have been comparable to other Plot 1 yields, around 123 bu/ac.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Niese Brothers, 7510 Cole Road, Crestline, Ohio 44827

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Corn	16,600	35.9	86.7	$153.45	$289.12	$-135.67
2	Fall coulter-chisel	Corn	18,000	36.6	92.3	160.32	279.46	-119.14

TILLAGE

1 Planted with John Deere 7000 conservation planter.
2 Fall coulter-chisel, tandem disc, planted with same planter.

PLOT NO.	1	2
Tillage treatment	No-till w/rye	Fall coulter-chisel
TOTAL VALUE	$153.45	$160.32
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast (100# 0-46-0	11.05	11.05
Broadcast (450# 0-0-60	33.75	33.75
Starter 8G 10-34-0	12.60	12.60
Nitrogen applied as 28-0-0	14.40	14.40
Nitrogen applied as 82-0-0	48.00	48.00
Chemicals:		
Herbicides	37.56	26.25
Insecticides	18.35	12.85
Interest: 7 months @ 14%	17.62	16.24
TOTAL VARIABLE COSTS	$233.33	$215.14
Machinery (custom rates)		
Primary tillage	$ -	$ 8.25
Secondary tillage	-	5.50
Planting	11.00	8.00
Cultivation	-	-
Spraying, spread fertilizer	9.00	6.00
Apply ammonia	6.00	6.00
Harvest	19.50	19.50
Trucking	10.29	11.07
TOTAL MACHINERY COSTS	$ 55.79	$ 64.32
TOTAL COSTS	$289.12	$279.46
RETURN TO LAND, MANAGEMENT	-$135.67	-$119.14

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Niese Brothers, 7510 Cole Road, Crestline, Ohio 44827

PLOT DETAILS:

Planted Robinson 3638 in two plots on May 22 in 30-inch rows. 13.5# Furadan 10G was banded over the row and seed was treated with Isotox "D". Intended seed drop was 30,800 of which 19,900 plants emerged in Plot 1 and 23,100 plants emerged in Plot 2. A somewhat slower planting speed would have helped emergence, particularly in Plot 1. Soils present are Bennington, Cardington and Alexandria silt loams. Tile drainage is random. 1980 crop was corn with tillage comparisons corresponding to those of the 1981 tillage demonstration. A rye cover crop was seeded in Plot 1 and stood about 24 inches tall at planting. 450# 0-0-60 and 100# 0-46-0 were fall broadcast. In spring, 300# N as anhydrous ammonia was applied preplant (no N-Serve). 8 gallons 10-34-0 was applied as a row starter. As 28% solution 60# N was applied with herbicides for a total N-P_2O_5-K_2O as follows: 369-76-270. With the 28% solution (20 gallons) plus 30 gallons of water as carrier (50 gallons total), 1 qt. Paraquat CL with 11 oz. X-77 spreader per 100 gallons carrier, 1.5 qt. Aatrex 4L, 2 qt. Bladex 4L and 2.5 pt. Dual 8E were applied just after planting to Plot 1. Plot 2 was sprayed similarly but without Paraquat. Grass and broadleaf control excellent. On June 4, Plot 1 was sprayed with 2 qt. Toxaphene 6E for control of armyworms. On June 26, 40% of the plants in Plot 2 were found infested with European corn borer. No treatment recommended. In September, root lodging began to occur in both plots. By harvest on October 30, lodging became severe in small circular patches of both plots. It is suspected that corn rootworm pressure from the previous crop plus dilution of the rootworm insecticide were in part responsible for the lodging. Harvested October 30.

Field tours of demonstrations enabled area farmers to evaluate first hand the positive and negative aspects of various tillage systems.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Geissman Farms, 6471 Cook Road, New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Corn	14,600	34.0	85.0	$156.23	$271.61	$-115.38
2	No-till	Corn	17,200	30.6	103.7	200.76	268.86	-68.10
3	Spring plow	Corn	15,200	34.9	89.9	162.25	270.49	-108.24

TILLAGE

1 Planted with Allis Chalmers 600 no-till air planter.
2 Planted with same planter.
3 Spring plow, tandem disc with harrogator, planted with same planter.

PLOT NO.	1	2	3
Tillage treatment	No-till w/rye	No-till	Spring plow
TOTAL VALUE	$156.23	$200.76	$162.25
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00
Fertilizer:			
Broadcast (100# 0-44-0	11.05	11.05	11.05
Broadcast (250# 0-0-60	18.75	18.75	18.75
Starter 20G 9-27-3	25.96	25.96	25.96
Nitrogen applied as 28-0-0	36.03	36.03	36.03
Nitrogen applied as 82-0-0	16.04	16.04	16.04
Chemicals:			
Herbicides	33.81	32.56	21.00
Insecticides	18.35	15.60	15.60
Interest: 7 months @ 14%	16.33	16.00	15.06
TOTAL VARIABLE COSTS	$216.32	$211.99	$199.49
Machinery (custom rates)			
Primary tillage	$ -	$ -	$ 11.00
Secondary tillage	-	-	7.00
Planting	11.00	11.00	8.00
Cultivation	-	-	-
Spraying, spread fertilizer	9.00	9.00	9.00
Apply ammonia	6.00	6.00	6.00
Harvest	19.50	19.50	19.50
Trucking	9.79	11.37	10.50
TOTAL MACHINERY COSTS	$ 55.29	$ 56.87	$ 71.00
TOTAL COSTS	$271.61	$268.86	$270.49
RETURN TO LAND, MANAGEMENT	-$115.38	-$ 68.10	-$108.24

1981 TILLAGE COMPARISON CULTURAL & ECONMIC DATA

Geissman Farms, 6471 Cook Road, New Washington, Ohio 44854

PLOT DETAILS:

Planted Trojan 1100 in three plots on May 23 in 30-inch rows. 13.5# Furadan 10G was applied in the furrow and seed was treated with Isotox "F". Intended seed drop was 28,000 of which 16,250 plants emerged in Plot 1, an estimated 18,000 plants emerged in Plot 2, and 15,900 plants emerged in Plot 3. Soils present are Tiro, Condit and Cardington silt loams. Tile drainage is random, only in lows. In Plots 1 and 3, 1980 crop was corn with tillage comparisons corresponding to those of the 1981 tillage demonstration. In Plot 2, 1980 crop was rye. A rye cover crop was seeded in Plots 1 and 3 and stood about 26 inches tall in Plot 1 at planting. In spring, 100# 0-44-0 and 250# 0-0-60 were broadcast. At planting 20 gallons 9-27-3 was applied as a row starter. As 28% solution 150# N was applied with herbicides. Then on July 2, 100# N was side dressed as anhydrous ammonia for a total N-P_2O_5-K_2O of: 270-104-157. Just after planting 1 qt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 2 qt. Aatrex 4L and 2.5 pt. Dual 8E were applied in Plots 1 and 2 using 50 gallons per acre 28% as carrier. Plot 3 was sprayed similarly but without Paraquat. On June 11, Plot 1 was sprayed with a mixture of 2 qt. Toxaphene 6E and 0.5 pt. Banvel D for control of armyworms and patches of buttonweeds, respectively. About half of both Plots 2 and 3 were sprayed with this same mixture for spot control of broadleaves. Grass and broadleaf control generally excellent. Harvested November 11.

Poor emergence in all plots and root lodging in Plots 1 and 3 were significant problems. It is possible that herbicides may have damaged sprouting corn plants. Also, Furadan was applied in the furrow to gain both rootworm control and armyworm suppression. Since this treatment did not eliminate the use of Toxaphene for armyworm control in Plot 1, banding the insecticide intially may have resulted in better rootworm control, especially in the case of second year corn.

When, in a straight corn rotation, Bob Geissman felt that rotating rootworm insecticides (carbamate form to phosphate form and vice versa) may be essential to guarantee control.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Jason Kalb, 6010 Vorndron Road, New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Corn	20.600	34.8	118.5	$213.97	$241.27	$-27.30
2	Fall chisel	Corn	24,750	34.2	125.6	229.03	237.09	-8.06
3	Fall plow	Corn	23,500	32.6	126.8	237.56	239.63	-2.07

TILLAGE

1 Planted with John Deere 7000 Conservation Tillage planter.
2 Fall chisel, tandem disc 2X, planted with same planter.
3 Fall plow, tandem disc 2X, planted with same planter.

PLOT NO.	1	2	3
Tillage treatment	No-till w/rye	Fall chisel	Fall plow
TOTAL VALUE	$213.97	$229.03	$237.56
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00
Fertilizer:			
Broadcast 200# 0-0-60	15.00	15.00	15.00
Starter 325# 9-23-30	33.15	33.15	33.15
Nitrogen applied as 82-0-0	28.88	28.88	28.88
Chemicals:			
Herbicides	32.26	21.00	21.00
Insecticides	18.93	13.43	13.43
Interest: 7 months @ 14%	13.73	12.36	12.36
TOTAL VARIABLE COSTS	$181.95	$163.82	$163.82
Machinery (custom rates)			
Primary tillage	$ -	$ 8.25	$ 11.00
Secondary tillage	-	11.00	11.00
Planting	11.00	8.00	8.00
Cultivation	-	-	-
Spraying, spread fertilizer	9.00	6.00	6.00
Apply ammonia	6.00	6.00	6.00
Harvest	19.50	19.50	19.50
Trucking	13.82	14.52	14.31
TOTAL MACHINERY COSTS	$ 59.32	$ 73.27	$ 75.81
TOTAL COSTS	$241.27	$237.09	$239.63
RETURN TO LAND, MANAGEMENT	$-27.30	$ -8.06	$ -2.07

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Jason Kalb, 6010 Vorndron Road, New Washington, Ohio 44854

PLOT DETAILS:

Planted Cargill 921 in three plots on May 26 in 30-inch rows. 6.7# Amaze 206 was banded over the rows and seed was treated with Isotox "D". Intended seed drop was 27,700 of which 24,550 plants emerged in Plot 1, 24,850 in Plot 2 and 27,150 plants emerged in Plot 3. Soils present are Tiro and Bennington silt loams. Tile drainage is random, only in lows. 1980 crop was corn with tillage comparisons corresponding to those of the 1981 tillage demonstration. A rye cover crop seeded in Plot 1 stood about 36 inches tall at planting. In spring, 200# 0-0-60 was broadcast. At planting 325# 9-23-30 was applied as a row starter. On June 22, 180# N was side dressed as anhydrous ammonia for a total $N-P_2O_5-K_2O$ of: 209-75-218. Just after planting 1 qt. Paraquat CL with 8 oz.X-77 spreader per 100 gallons water, 2.5 qt. Aatrex 4L and 3 qt. Lasso 4E were applied to Plot 1 using 60 gallons water per acre as carrier. Plots 2 and 3 were sprayed similarly but without Paraquat. On June 12, Plot 1 was sprayed with 2 qt. Toxaphene 6E for control of armyworms. No other insect problems. Excellent grass and broadleaf control. Harvested November 16.

For Jason Kalb, use of a fertilizer cart behind the planter facilitated timely placement of larger quantities of fertilizer near the corn plants. This procedure insures better fertilizer utilization, particularly where initial soil fertility is low, and minimizes fertilizer losses that might occur in no-till through surface dissolution of broadcast applications.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Herb Crum, 5108 South County Road 43, Tiffin, Ohio 44883

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Corn	16,000*	36.4	94.6	$165.75	$270.46	$-104.71

*estimated, see explanation opposite page.

TILLAGE

1 Planted with John Deere 7000 conservation planter.

PLOT NO.	1
Tillage treatment	No-till /rye
TOTAL VALUE	$165.75
Seed, lime, misc.	$ 40.00
Fertilizer:	
Broadcast (100# 0-44-0	11.05
Broadcast (300# 0-0-60	22.50
Starter 220# 9-29-19+	29.70
Nitrogen applied as 28-0-0	43.20
Chemicals:	
Herbicides	38.27
Insecticides	18.35
Interest: 7 months @ 14%	16.58
TOTAL VARIABLE COSTS	$219.65
Machinery (custom rates)	
Primary tillage	$ -
Secondary tillage	-
Planting	11.00
Cultivation	-
Spraying, spread fertilizer	9.00
Apply ammonia	-
Harvest	19.50
Trucking	11.31
TOTAL MACHINERY COSTS	$ 50.81
TOTAL COSTS	$270.46
RETURN TO LAND, MANAGEMENT	-$104.71

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Herb Crum, 5108 South County Road 43, Tiffin, Ohio 44883

PLOT DETAILS:

Planted Leader SX610 on May 9 in 30-inch rows. 13.5# Furadan 10G was applied in the furrow and seed was treated with Isotox "F". Intended seed drop was 29,900 of which 22,150 plants emerged in the Blount and Morley silt loam soils. No tile drainage present. 1980 crop was no-till corn. A rye cover crop was seeded and stood about 32 inches tall at planting. In spring, 100# 0-44-0 and 300# 0-0-60 were broadcast. 220# 9-29-19+1Z+.1Fe+1S+.5Mg+1Ca was applied as a row starter. As 28% solution, 180# N was also applied with herbicides for a total N-P_2O_5-K_2O as follows: 200-108-222. Just after planting, 1 qt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 1 qt. Princep 4L, 2 qt. Bladex 4L and 2.5 pt. Dual 8E were applied using 60 gallons 28% per acre as carrier. On June 8 1 pt. 2,4-D amine and 2 qt. Toxaphene 6E were applied to control broadleaves (dandelion, plantain) and armyworm, respectively. Weed control was excellent. No insect problems other than armyworm. Moisture stress was evident at times during summer, especially on hills. Root lodging became a problem following wet and windy weather in early October. Between September 9 and harvest on October 21, about 25% of the stand lodged leaving an estimated final stand of 16,000 plants. Since Furadan in the furrow did not eliminate the need for Toxaphene, banding the insecticide initially may have resulted in better root worm control, especially in this case of second year corn.

Proper application of herbicides is as important as selecting the correct herbicides. Uniform kill of this rye in spring showed skill of the applicator in spraying proper volumes of material evenly.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

John Jacoby, 6529 Connely Road, New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Corn	24,000	18.3	101.5	$229.07	$243.39	$-14.32
2	Spring disc	Corn	25,400	18.5	96.8	218.44	236.00	-17.56

TILLAGE

1 Planted with John Deere 7000 conservation tillage planter.
2 Spring tandem disc, planted with same planter.

PLOT NO.	1	2
Tillage treatment	No-till rye	Spring disc
TOTAL VALUE	$229.07	$218.44
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast (100# 0-44-0	11.05	11.05
Broadcast (300# 0-0-60	22.50	22.50
Starter 200# 6-24-24	19.10	19.10
Nitrogen applied as 28-0-0	21.60	21.60
Nitrogen applied as 82-0-0 (with 1 pt. N-Serve)	25.62	25.62
Chemicals:		
Herbicides	24.27	15.50
Insecticides	12.85	12.85
Interest: 7 months @ 14%	14.45	13.74
TOTAL VARIABLE COSTS	$191.44	$181.96
Machinery (custom rates)		
Primary tillage	$ -	$ 5.50
Secondary tillage	-	-
Planting	11.00	8.00
Cultivation	-	-
Spraying, spread fertilizer	6.00	6.00
Apply ammonia	6.00	6.00
Harvest	19.50	19.50
Trucking	9.45	9.04
TOTAL MACHINERY COSTS	$ 51.95	$ 54.04
TOTAL COSTS	$243.39	$236.00
RETURN TO LAND, MANAGEMENT	$-14.32	$-17.56

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

John Jacoby, 6529 Connely Road, New Washington, Ohio 44854

PLOT DETAILS:

Planted Pioneer 3780 in two plots on May 23 in 30-inch rows. 13.5# Furadan 10G was banded over the rows and seed was treated with Isotox "D". Intended seed drop was 29,900 of which 26,200 plants emerged in Plot 1, and 26,700 plants emerged in Plot 2. Soil present is Blount silt loam. Tile drainage is random. 1980 crop was corn. A rye cover crop stood 12 inches tall in Plot 1 at planting. In spring 100# 0-44-0 and 300# 0-0-60 was broadcast. As well, 141# N as anhydrous ammonia (1 pt. N-Serve) was applied preplant. At planting 200# 6-24-24 was applied as a row starter. As 28% solution, 90# N was applied with herbicides for a total N-P_2O_5-K_2O of: 243-92-228. With the 28% solution (30 gallons) plus 30 gallons water as carrier (60 gallons total), 1.5 pt. Paraquat CL with 12 oz. X-77 spreader per 100 gallons carrier, 2 qt. Aatrex 4L and 2 qt. Princep 4L were applied to Plot 1 just after planting. Plot 2 was sprayed similarly but without Paraquat. Good grass control, some fall panicum. Excellent broadleaf control. No insect problems. Minor lodging at harvest on December 11.

The ultimate goal of using conservation tillage practices is to keep soil and fertilizers out of the water and on the land where they can enhance crop production.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Don Crum, 5473 New Haven Road, Shelby, Ohio 44875

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	25,000	24.2	120.7	$255.37	$235.36	$ 20.01

TILLAGE

1 Planted with John Deere 7000 conservation tillage planter.

PLOT NO.	1
Tillage treatment	No-till
TOTAL VALUE	$255.37
Seed, lime, misc.	$ 40.00
Fertilizer:	
Broadcast (50# 0-44-0	5.52
Broadcast (250# 0-0-60	18.75
Starter 200# 8-32-16	24.00
Nitrogen applied as 28-0-0	54.08
Chemicals:	
Herbicides	29.60
Insecticides	.70
Interest: 7 months @ 14%	14.10
TOTAL VARIABLE COSTS	$186.75
Machinery (custom rates)	
Primary tillage	$ -
Secondary tillage	-
Planting	11.00
Cultivation	-
Spraying, spread fertilizer	6.00
Apply ammonia	-
Harvest	19.50
Trucking	12.11
TOTAL MACHINERY COSTS	$ 48.61
TOTAL COSTS	$235.36
RETURN TO LAND, MANAGEMENT	$ 20.01

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Don Crum, 5473 New Haven Road, Shelby, Ohio 44875

PLOT DETAILS:

Planted DeKalb XL55A on May 20 in 38-inch rows. Seed was treated with Isotox "D". Intended seed drop was 28,100 of which 25,950 plants emerged in the Pewamo silty clay loam and Bennington, Cardington silt loam soils. Some tile drainage present, only in lows. 1980 crop was no-till soybeans, 1979 crop was no-till corn. In spring, 50# 0-44-0 plus 250# 0-0-60 was broadcast. At planting, 200# 8-32-16 was applied as a row starter. As 28% solution, 225# N was applied with herbicides for a total N-P_2O_5-K_2O of: 241-86-182. Just after planting, 1 pt.Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 2 qt. Princep 4L and 3 qt. Lasso 4E were applied using 75 gallons per acre 28% as carrier. Excellent grass and broadleaf control. On July 2, infestation of 50% of the plants by first brood European corn borer was recorded. By July 9, 75% of the plants showed damage with live larvae present. No treatment was made. Stalk lodging was not a problem during harvest on November 10.

Three years of demonstrating a rotation of no-till corn and soybeans convinced Don Crum that even without a cover crop, residue amounts have remained sufficient to insure benefits of a no-till system. As well, yields stayed at levels above those expected by Don.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Jim Spitzer, 6387 East County Road 12, Bloomville, Ohio 44818

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	22,200	22.3	115.4	$249.85	$281.47	$-31.62
2	Spring plow	Corn	22,950	20.5	107.0	236.67	292.10	-55.43

TILLAGE

1 Planted with John Deere 7000 conservation planter.
2 Spring plow, disc with cultipacker, harrogate with harrow, planted with same planter.

PLOT NO.	1	2
Tillage treatment	No-till	Spring plow
TOTAL VALUE	$249.85	$236.67
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast 750# 3-9-27	63.38	63.38
Starter 170# 8-32-16	20.40	20.40
Nitrogen applied as 28-0-0	41.04	41.04
Chemicals:		
Herbicides	25.44	19.15
Insecticides	21.15	21.15
Interest: 7 months @ 14%	17.26	16.75
TOTAL VARIABLE COSTS	$228.67	$221.87
Machinery (custom rates)		
Primary tillage	$ -	$ 11.00
Secondary tillage	-	10.50
Planting	11.00	8.00
Cultivation	-	-
Spraying, spread fertilizer	11.00	11.00
Apply ammonia	-	-
Harvest	19.50	19.50
Trucking	11.30	10.23
TOTAL MACHINERY COSTS	$ 52.80	$ 70.23
TOTAL COSTS	$281.47	$292.10
RETURN TO LAND, MANAGEMENT	$-31.62	$-55.43

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Jim Spitzer, 6387 East County Road 12, Bloomville, Ohio 44818

PLOT DETAILS:

Planted DeKalb XL55A in two plots on May 5 in 30-inch rows. 13.5# Furadan 10G was applied in the furrow. Intended seed drop was 26,100 of which 23,900 plants emerged in Plot 1 and 23,000 plants in Plot 2. Soils in the plots are Gallman and Milton variant loam soils. No tile drainage present, natural soil drainage is good in these soils. 1980 crop was soybeans with tillage comparisons corresponding to those of the 1981 tillage demonstration. In spring, 750# 3-9-27 was broadcast. At planting, 170# 8-32-16 was applied as a row starter. As 28% solution, 171# N was applied with herbicides for a total $N-P_2O_5-K_2O$ as follows: 208-122-230. Just after planting 1 pt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 1.8 qt. Aatrex 4L and 2.5 pt. Dual 8E were applied to Plot 1, using 57 gallons per acre 28% as carrier. Plot 2 was sprayed similarly but without Paraquat. On June 26 infestation of both plots by first brood European corn borer was recorded. By July 1, over 50% of the plants showed damage with live larvae present. On July 3, 10# Furadan 10G was applied by plane for corn borer control. Control was excellent. Grass and broadleaf control was generally excellent. Small spots of fall panicum in Plot 2 where water temporarily ponded. Harvested November 6.

On his loam soils, Jim Spitzer this year found no-till corn after no-till soybeans to outyield conventionally planted corn after soybeans.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Bill Smith, 10685 East Township Road 106, Attica, Ohio 44807

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Corn	13,900	26.8	40.5	$ 83.01	$268.88	$-185.87
2	Fall plow	Corn	23,100	22.8	116.2	250.17	282.78	-32.61
3	No-till	Corn	20,000	23.7	96.4	205.18	265.33	-60.15

TILLAGE

1 Planted with John Deere 7000 conservation planter.
2 Fall plow, disc with cultipacker, harrogate, planted with same planter.
3 Planted with same planter.

PLOT NO.	1	2	3
Tillage treatment	No-till/rye	Fall plow	No-till
TOTAL VALUE	$ 83.01	$250.17	$205.18
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00
Fertilizer:			
Broadcast (50# 0-44-0	5.52	5.52	5.52
Broadcast (300# 0-0-60	22.50	22.50	22.50
Starter 24G 9-27-3+2S	35.78	35.78	35.78
Nitrogen applied as 28-0-0	50.40	50.40	50.40
Chemicals:			
Herbicides	35.62	23.75	35.62
Insecticides	18.35	18.35	12.85
Interest: 7 months @ 14%	17.00	16.03	16.55
TOTAL VARIABLE COSTS	$225.17	$212.33	$219.22
Machinery (custom rates)			
Primary tillage	$ -	$ 11.00	-
Secondary tillage	-	11.50	-
Planting	11.00	8.00	11.00
Cultivation	-	-	-
Spraying, spread fertilizer	9.00	9.00	6.00
Apply ammonia	-	-	-
Harvest	19.50	19.50	19.50
Trucking	4.21	11.45	9.61
TOTAL MACHINERY COSTS	$ 43.71	$ 70.45	$ 46.11
TOTAL COSTS	$268.88	$282.78	$265.33
RETURN TO LAND, MANAGEMENT	-$185.87	-$ 32.61	-$ 60.15

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Bill Smith, 10685 East Township Road 106, Attica, Ohio 44807

PLOT DETAILS:

Planted Pioneer 3780 in three plots on May 8 in 30-inch rows. 13.5# Furadan 10G was applied in the furrow and seed was treated with Isotox "D". Intended seed drop was 27,700 of which 21,550 plants emerged in Plot 1, 22,400 in Plot 2 and 22,000 plants emerged in Plot 3. Soil present is Blount silt loam. Tile drainage is systematic. For Plot 1 and Plot 2, 1980 crop was soybeans with Plot 1 having a vigorous and dense stand of rye which stood about 24 inches tall at planting. For Plot 3, 1980 crop was wheat seeded with clover about 12 inches tall at planting. In spring, 50# 0-44-0 and 300# 0-0-60 were broadcast. 24 gallons 9-27-3+2S was applied as a row starter. As 28% solution, 210# N was also applied for a total N-P_2O_5-K_2O as follows: 234-96-188. Just after planting, 1 qt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 1 qt. Aatrex 4L, 1.75 qt. Bladex 4L and 2.5 pt. Dual 8E were applied to Plots 1 and 3 using 70 gallons per acre 28% as carrier. Plot 2 was sprayed similarly but without Paraquat. On June 16, Plots 1 and 2 were sprayed with 2 qt. Toxaphene 6E for control of armyworms. Good grass and excellent broadleaf control. Foxtail pressure where stand was poor, particularly in Plot 1. No insect problems other than armyworms. Harvested October 24.

Total lack of success in Plot 1 resulted from conditions contributing to early season crop stress and to virtually complete loss of all nitrogen applied. At planting soil was wet. For almost 2 weeks after planting, soils remained cool and at or near saturation--partially due to weather but also due to the dying stand of dense rye. After a short dry period at the end of May and beginning of June, several major rainstorms again left soil in the plot at or near saturation for a period of 2-3 weeks. Under these combinations of conditions, denitrification and leaching were severe. In Plot 3 soil was drier at planting and soil temperature somewhat warmer than Plot 1. Clover residue decomposed quickly after spraying and permitted more rapid drying and warming of soil than possible in Plot 1. Nitrogen from the clover was also available to assist plant growth. In Plot 2 soil was driest and warmest at planting. While erosion and washing caused some stand loss, soil was never as cool and wet for the length of time it was in the other plots, especially Plot 1.

Cool, wet conditions following early planting into rye combined to cause significent yield reductions over fall plow and no-till into wheat systems in the Bill Smith demonstration plot. Such conditions led to early crop stress and nitrogen losses.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Art Hall, 7128 East Township Road 106, Republic, Ohio 44867

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Corn	21,200	30.3	80.8	$157.54	$284.01	$-126.47
2	Fall chisel	Corn	22,100	28.6	119.6	238.61	286.34	-47.73
3	Spring plow	Corn	23,900	31.6	96.9	184.63	293.12	-108.49

TILLAGE

1 Planted with White no-till 5100 Seed Boss planter.
2 Fall chisel, field cultivate, planted with same planter.
3 Spring plow, field cultivate 2X, planted with same planter.

PLOT NO.	1	2	3
Tillage treatment	No-till w/rye	Fall chisel	Spring plow
TOTAL VALUE	$157.54	$238.61	$184.63
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00
Fertilizer:			
Broadcast (250# 0-46-0	27.62	27.62	27.62
Broadcast (300# 0-0-60	22.50	22.50	22.50
Starter 22G 8-24-3	24.48	24.48	24.48
Nitrogen applied as 28-0-0	50.48	50.48	50.48
Chemicals:			
Herbicides	42.74	30.87	30.87
Insecticides	12.85	12.85	12.85
Interest: 7 months @ 14%	18.02	17.05	17.05
TOTAL VARIABLE COSTS	$238.69	$225.85	$225.85
Machinery (custom rates)			
Primary tillage	$ -	$ 8.25	$ 11.00
Secondary tillage	-	6.00	12.00
Planting	11.00	8.00	8.00
Cultivation	-	-	-
Spraying, spread fertilizer	6.00	6.00	6.00
Apply ammonia	-	-	-
Harvest	19.50	19.50	19.50
Trucking	8.82	12.74	10.77
TOTAL MACHINERY COSTS	$ 45.32	$ 60.49	$ 67.27
TOTAL COSTS	$284.01	$286.34	$293.12
RETURN TO LAND, MANAGEMENT	-$126.47	-$ 47.73	-$108.49

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Art Hall, 7128 East Township Road 106, Republic, Ohio 44867

PLOT DETAILS:

Planted Crows 444 in three plots on June 2 in 36-inch rows. 13.5# Furadan 10G was applied in the furrow and seed was treated with Isotox "D". Intended seed drop was 28,600 of which 22,650 plants emerged in Plot 1, 21,900 plants in Plot 2, and 23,600 plants emerged in Plot 3. Soil present is Tiro silt loam. Tile drainage is random and seemingly ineffective. Water stood on portions of all plots several times during the growing season. 1980 crop was soybeans. A rye cover crop seeded in Plots 1 and 3 stood about 72 inches tall at planting in Plot 1. In fall, 250# 0-46-0 and 300# 0-0-60 was broadcast. At planting, 22 gallons 8-25-3 were applied as a row starter. As 28% solution, 210# N was applied with herbicides for a total N-P_2O_5-K_2O of: 229-175-187. Just after planting, 1 qt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 1.5 qt. Princep 4L, 2.5 qt. Bladex 4L and 2.5 pt. Dual 8E were applied to Plot 1 using 70 gallons per acre 28% as carrier. On July 7 plants in Plots 2 and 3 showed considerable moisture stress. Similar conditions were noted in the same plots during late August. Moisture stress on Plot 1 plants did not appear significant during the growing season. Excellent grass and broadleaf control. No insect problems. Harvested November 16.

In Plots 1 and 3, the combination of poor soil drainage and a decomposing rye cover crop resulted in conditions suitable for nitrogen loss. Rye cover on the surface, Plot 1, accelerated denitrification by keeping soils wetter longer than in the other plots. On Plot 3, much N was immobilized by microbial decomposition of the buried rye. Compaction may have also been a factor in reducing Plot 3 yields.

While advantages of a rye cover crop sometimes are apparent, Art and Dale Hall decided that 6 feet of rye was a bit excessive! Management of rye cover proved exceedingly difficult during a wet spring.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Ron Vanasdale, Rt. 2, Box 327, Shelby, Ohio 44875

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1A	No-till with rye	Corn	22,300	29.3	125.9	$249.20	$291.40	$-42.20
1B	No-till with rye	Corn	23,600	32.2	135.3	255.58	293.03	-37.45
2A	Fall Miller disc	Corn	25,200	28.1	124.0	249.15	281.94	-32.79
2B	Fall Miller disc	Corn	28,600	33.2	134.0	248.80	284.09	-35.29

TILLAGE

1A Planted Dekalb XL 61 with John Deere 7000 conservation planter.
1B Planted Robinson 3638 with same planter.
2A Fall Miller disc, spring field cultivate 4 weeks before planting, planted Dekalb XL 61 with same planter (stale seedbed system).
2B Fall Miller disc, spring field cultivate 4 weeks before planting, planted Robinson 3638 with same planter (stale seedbed system).

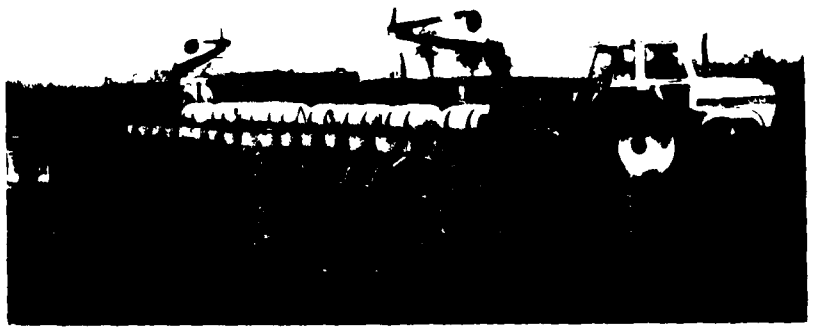
PLOT NO.	1A	1B	2A	2B
Tillage treatment	No-till W/rye	No-till w/rye	F. Miller disc	F. Miller disc
TOTAL VALUE	$249.20	$255.58	$249.15	$248.80
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00	$ 40.00
Fertilizer:				
(60# 0-0-22+11Mg+23S	4.20	4.20	4.20	4.20
Broadcast (180# 18-46-0	23.40	23.40	23.40	23.40
(360# 0-0-60	27.00	27.00	27.00	27.00
Starter 12G 10-34-0	18.20	18.20	18.20	18.20
Nitrogen applied as 82-0-0/N Serve	38.68	38.68	38.68	38.68
Nitrogen applied 28-0-0	18.01	18.01	18.01	18.01
Chemicals:				
Herbicides	27.86	27.86	16.50	16.50
Insecticides	18.35	18.35	12.85	12.85
Interest: 7 months @ 14%	17.62	17.62	16.24	16.24
TOTAL VARIABLE COSTS	$232.36	$232.36	$215.08	$215.08
Machinery (custom rates)				
Primary tillage	$ -	$ -	$ 8.25	$ 8.25
Secondary tillage	-	-	6.00	6.00
Planting	11.00	11.00	8.00	8.00
Cultivation	-	-	-	-
Spraying, spread fertilizer	9.00	9.00	6.00	6.00
Apply ammonia	6.00	6.00	6.00	6.00
Harvest	19.50	19.50	19.50	19.50
Trucking	13.54	15.17	13.11	15.26
TOTAL MACHINERY COSTS	$ 59.04	$ 60.67	$ 66.86	$ 69.01
TOTAL COSTS	$291.40	$293.03	$281.94	$284.09
RETURN TO LAND, MANAGEMENT	$-42.20	$-37.45	$-32.79	$-35.29

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Ron Vanasdale, Rt. 2, Box 327, Shelby, Ohio 44875

PLOT DETAILS:

Planted DeKalb 61 and Robinson 3638 in 2 plots on May 22 in 30-inch rows. 13.5# Furadan 10G was banded over the rows and seed was treated with Isotox "D". Intended seed drop was 29,000 of which 25,000 Dekalb and 29,150 Robinson plants emerged in Plot 1 and 25,200 Dekalb and 28,600 Robinson plants emerged in Plot 2. Soils present are Luray silt clay loam and Tiro, Lykens and Fitchville silt loams. Tile drainage is systematic. 1980 crop was soybeans. A rye cover crop seeded in Plot 1 stood 26 inches tall when sprayed two weeks prior to planting with 1 pt. Paraquat CL with 8 oz. X-77 spreader per 100 gallons water, 50 gallons spray per acre. In fall, 203# N as stabilized anhydrous ammonia (1 qt. N-Serve) was applied. As well, 60# 0-0-22+11Mg+23S, 180# 18-46-0 and 360# 0-0-60 was fall broadcast. At planting, 12 gallons 10-34-0 was applied as a row starter. As 28% solution, 75# N was applied with herbicides for a total $N-P_2O_5-K_2O$ of: 323-128-229. With the 28% solution (25 gallons) plus 25 gallons water as carrier (50 gallons total), 1 pt. Paraquat CL with 12 oz. X-77 spreader per 100 gallons carrier, 1.5 qt. Aatrex 4L, 3 qt. Bladex 4L and 2 qt. Toxaphene 6E were applied to Plot 1 just after planting. Plot 2 was sprayed similarly but without Paraquat. Excellent grass and broadleaf control. No insects. No lodging. Harvested November 16.



Ron Vanasdale increased his rate of no-till planting this year--not by driving faster, but by planting more rows at the same time.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Gene Studer, 6309 Connely Road, New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Corn	23,800	29.0	147.5	$293.97	$290.45	$ 3.52
2	Fall chisel	Corn	24,600	29.0	152.6	304.13	282.26	21.87
3	Fall plow	Corn	25,600	29.3	148.3	295.12	284.17	10.95

TILLAGE

1 Planted with John Deere 7000 conservation planter.
2 Fall chisel, field cultivate with harrow, planted with same planter, rotary hoe.
3 Fall plow, field cultivate with harrow, planted with same planter, rotary hoe.

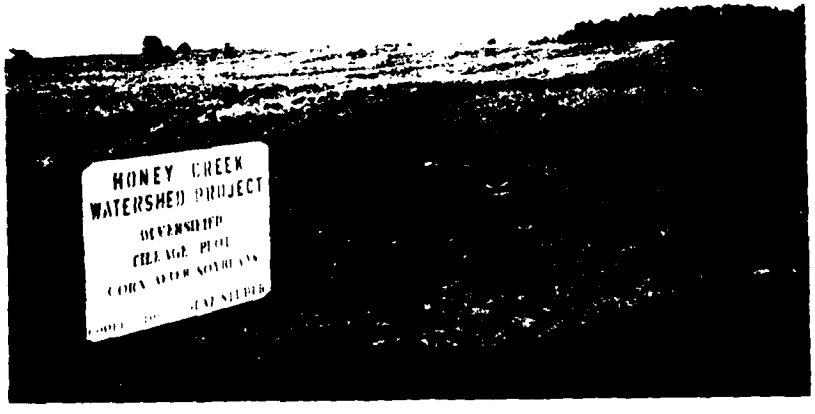
PLOT NO.	1	2	3
Tillage treatment	No-till/rye	Fall chisel	Fall plow
TOTAL VALUE	$293.97	$304.13	$295.12
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00
Fertilizer:			
Broadcast (175# 18-46-0	22.75	22.75	22.75
Broadcast (350# 0-0-60	26.25	26.25	26.25
Starter 170# 14-35-15	22.95	22.95	22.95
Nitrogen applied as 28-0-0	7.20	7.20	7.20
Nitrogen applied as 82-0-0/N-Serve	40.84	40.84	40.84
Chemicals:			
Herbicides	33.51	21.00	21.00
Insecticides	18.35	12.85	12.85
Interest: 7 months @ 14%	17.30	15.83	15.83
TOTAL VARIABLE COSTS	$229.15	$209.67	$209.67
Machinery (custom rates)			
Primary tillage	$ -	$ 8.25	$ 11.00
Secondary tillage	-	6.00	6.00
Planting	11.00	8.00	8.00
Cultivation	-	2.50	2.50
Spraying, spread fertilizer	9.00	6.00	6.00
Apply ammonia	6.00	6.00	6.00
Harvest	19.50	19.50	19.50
Trucking	15.80	16.34	15.50
TOTAL MACHINERY COSTS	$ 61.30	$ 72.59	$ 74.50
TOTAL COSTS	$290.45	$282.26	$284.17
RETURN TO LAND, MANAGEMENT	$ 3.52	$ 21.87	$ 10.95

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Gene Studer, 6309 Connely Road, New Washington, Ohio 44854

PLOT DETAILS:

Planted Porter Ex58 in three plots on May 5 in 30-inch rows. 13.5# Furadan 10G was applied in the furrow and seed was treated with Isotox "D". Intended seed drop was 29,900 of which 24,950 plants emerged in Plot 1, 27,750 in Plot 2 and 27,250 plants emerged in Plot 3. Soils in the plots are Condit silty clay loam and Bennington silt loam. Tile drainage is sytematic. 1980 crop was soybeans with tillage comparisons corresponding to those of the 1981 tillage demonstration. Rye was seeded in Plot 1 and stood about 18 inches tall at planting. In fall, 175# 18-46-0 and 350# 0-0-60 were broadcast. On April 2, 217# N was applied as stabilized (1 qt. N-Serve) anhydrous ammonia. At planting, 170# 14-35-15 was applied as a row starter. As 28% solution, 30# N was applied with herbicides for a total $N-P_2O_5-K_2O$ as follows: 302-140-236. With the 28% solution (10 gallons) plus 40 gallons of water as carrier (50 gallons total), 1 qt. Paraquat CL with 10 oz. X-77 spreader per 100 gallons carrier, 2 qt. Aatrex 4L and 2.5 pt. Dual 8E were applied to Plot 1 just after planting. Plots 2 and 3 were sprayed similarly but without Paraquat. On June 17, Plot 1 was sprayed with a mixture of 2 qt. Toxaphene 6E and 0.5 pt. Banvel D for control of armyworms and broadleaves, respectively. At the same time about half of both Plots 2 and 3 were sprayed with 0.5 pt. Banvel D for control of broadleaf weeds. Excellent grass and broadleaf control in all plots. Harvested November 5.



Gene Studer fall applied anhydrous ammonia with N-Serve and achieved successful nitrogen utilization in his fall plow, fall chisel, and no-till comparisons.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Ross Eckstein, 6521 Johnston Road, New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	20,800	29.3	69.8	$138.18	$246.58	$-108.40
2	Spring plow	Corn	23,200	26.6	92.2	189.08	257.78	-68.70

TILLAGE

1 Planted with Allis Chalmers 333 no-till air planter.
2 Spring plow, field cultivate with drag 3X, planted with same planter.

PLOT NO.	1	2
Tillage treatment	No-till	Spring plow
TOTAL VALUE	$138.18	$189.08
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast (100# 0-46-0	11.05	11.05
Broadcast (200# 0-0-60	15.00	15.00
Starter 225# 6-24-24	21.49	21.49
Nitrogen applied as 28-0-0	21.64	21.64
Nitrogen applied as 82-0-0	33.37	33.37
Chemicals:		
Herbicides	30.21	18.75
Insecticides	6.20	.70
Interest: 7 months @ 14%	14.61	13.23
TOTAL VARIABLE COSTS	$193.57	$175.23
Machinery (custom rates)		
Primary tillage	$ -	$ 11.00
Secondary tillage	-	22.50
Planting	11.00	8.00
Cultivation	-	-
Spraying, spread fertilizer	9.00	6.00
Apply ammonia	6.00	6.00
Harvest	19.50	19.50
Trucking	7.51	9.55
TOTAL MACHINERY COSTS	$ 53.01	$ 82.55
TOTAL COSTS	$246.58	$257.78
RETURN TO LAND, MANAGEMENT	-$108.40	-$ 68.70

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Ross Eckstein, 6521 Johnston Road, New Washington, Ohio 44854

PLOT DETAILS:

Planted Pioneer 3517 in two plots on May 21 in 30-inch rows. Seed was treated with Isotox "F". Intended seed drop was 30,000 of which 29,400 plants emerged in Plot 1 and 28,800 plants emerged in Plot 2. Seed spacing in the rows was somewhat uneven with plants frequently emerging in groups of 2 or 3. Soils present are Bennington and Cardington silt loams. No tile drainage present. 1980 crop was soybeans with tillage comparisons corresponding to those of the 1981 tillage demonstration. A rye cover crop was seeded in both plots and stood about 36 inches tall in Plot 1 at planting. On April 10, 208# N as anhydrous ammonia was applied preplant (no N-Serve). At planting, 225# 6-24-24 was applied as a row starter. Just after planting, 90# N as 28% solution was applied with herbicides. Then after planting and following partial decomposition of the rye, 100# 0-46-0 and 200# 0-0-60 were broadcast for a total N-P_2O_5-K_2O of: 312-54-174. With the 28% solution (30 gallons) plus 30 gallons of water as carrier (60 gallons total), 1 qt. Paraquat CL with 12 oz. X-77 spreader per 100 gallons carrier, 1.75 qt. Aatrex 4L and 3 qt. Lasso 4E were applied to Plot 1. Plot 2 was sprayed similarly but without Paraquat. On June 8, 2 qt. Toxaphene 6E was applied to Plot 1 for control of armyworms. On June 26, over 80% of the plants in Plot 2 showed infestation by first brood European corn borer. No treatment made. Grass and broadleaf control generally excellent. Harvested November 10.

Depressed Plot 1 yield seemingly due to decomposition of dense and tall rye cover crop during an extremely wet June. Rye residue prohibited surface drying on sunny or windy days. Resulting cool and wet soils stunted early crop growth and also produced conditions suitable for loss of nitrogen through denitrification. Barren stalks, resulting in part from uneven row spacing of plants in a high population stand, were common in both plots but more so in Plot 1. Compaction resulting from numerous trips across the field in spring may have caused lower yields in both plots.

Following a single early June storm, soil loss differences from no-till and conventionally farmed portions of Ross Eckstein's field were dramatic! It is estimated that over 10 tons of soil per acre were eroded from the conventional plot, less than 1 ton from the no-till plot.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Galen King, 4792 South State Route 18, Tiffin, Ohio 44883

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till w/wheat (28% N)	Corn	17,700	27.5	50.4	$102.59	$257.23	$-154.64
2	Fall chisel (28% N)	Corn	19,500	27.5	62.2	126.59	256.72	-130.13
3	Fall chisel (NH_3N)	Corn	19,000	24.0	90.0	191.48	261.57	-70.09

TILLAGE

1 Planted with Kinze no-till planter.
2 Fall chisel, field cultivate, disc, planted with same planter.
3 Fall chisel, field cultivate (anhydrous application*), disc, planted with same planter.

PLOT NO.	1	2	3
Tillage treatment	No-till (28%)	Fall chisel (28%)	Fall chisel (NH_3N)
TOTAL VALUE	$102.59	$126.59	$191.48
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00
Fertilizer:			
Broadcast (200# 18-46-0	26.00	26.00	26.00
Broadcast (300# 0-0-60	22.50	22.50	22.50
Starter 22G 6-18-6	-	22.20	22.20
Starter 27G 6-18-6	27.75	-	-
Nitrogen applied as 28-0-0	36.03	36.03	-
Nitrogen applied as 82-0-0 (with N-Serve)	-	-	38.21
Chemicals:			
Herbicides	34.05	22.50	22.50
Insecticides	12.85	12.85	12.85
Interest: 7 months @ 14%	15.27	14.87	15.05
TOTAL VARIABLE COSTS	$215.45	$196.95	$199.31
Machinery (custom rates)			
Primary tillage	$ -	$ 8.25	$ 8.25
Secondary tillage	-	11.50	11.50*
Planting	11.00	8.00	8.00
Cultivation	-	-	-
Spraying, spread fertilizer	6.00	6.00	6.00
Apply ammonia	-	-	*
Harvest	19.50	19.50	19.50
Trucking	5.28	6.52	9.01
TOTAL MACHINERY COSTS	$ 41.78	$ 59.77	$ 62.26
TOTAL COSTS	$257.23	$256.72	$261.57
RETURN TO LAND, MANAGEMENT	-$154.64	-$130.13	-$ 70.09

*Cost to apply anhydrous ammonia included in secondary tillage costs.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Galen King, 4792 South State Route 53, Tiffin, Ohio 44883

PLOT DETAILS:

Planted Pioneer 3780 in three plots on June 5 in 30-inch rows. 13.5# Furadan 10G was banded over the rows and seed was treated with Isotox "D". Intended seed drop was 26,000 of which an estimated 17,500 plants emerged in Plot 1, 19,800 emerged in Plot 2 and 19,800 emerged in Plot 3. Soils present are Lenawee silty clay loam, Pandora and Blount silt loams and Gallman and Haskins loams. No tile drainage present. The field lies in bottomlands along Honey Creek and in most years has good drainage. Following June storms, however, water stood in all plots on several occasions. 1980 crop was soybeans. A wheat cover crop seeded in Plot 1 stood 30 inches tall at planting. In fall 200# 18-46-0 and 300# 0-0-60 were broadcast on all plots. In spring 200# N as anhydrous ammonia (+ 1 qt. N-Serve) was applied preplant during field cultivation in Plot 3. At planting 22 gallons 6-18-6 was applied as a row starter in Plots 2 and 3. In Plot 1, 27 gallons 6-18-6 was applied. As 28% solution, 150# N was applied with herbicides in Plots 1 and 2. Resulting total N-P_2O_5-K_2O for Plots 1, 2 and 3, respectively, were: 204-146-198, 200-134-194, 250-134-194. Just after planting, 1 qt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 2 qt. Aatrex 4L and 3 pt. Dual 8E were applied to Plot 1 using 50 gallons per acre 28% as carrier. Plot 2 was sprayed similarly but without Paraquat. Also after planting, the same herbicides, excluding Paraquat, were applied to Plot 3 using 30 gallons per acre water in place of 28%. Excellent grass and broadleaf control. No insect problems. Harvested November 18.

Standing water and excessive moisture during the 3 weeks following planting reduced emergence and ultimately final stand in all plots. Extra nitrogen as anhydrous ammonia helped yield in Plot 3, but saturated soil conditions in June led to significant nitrogen losses in all plots through denitrification. Wheat cover in Plot 1 seemed to accelerate losses further by maintaining saturated surface soils for longer periods of time. Crop stand and vigor were noticeably greater in even slightly elevated portions of the field, typically the better drained loam soils. This observation was especially true for Plot 1.

June flooding of Galen King's field along Honey Creek caused substantial yield reductions in all portions of the demonstration plot.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Albert Heydinger, 6132 State Route 103, New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	21,600	33.1	97.5	$181.07	$258.07	$-77.00
2	Fall coulter-chisel	Corn	26,500	35.9	108.9	192.74	254.97	-62.23
3	Spring plow	Corn	25,600	33.1	119.1	221.22	257.34	-35.12

TILLAGE

1 Planted with John Deere 7000 conservation planter.
2 Fall coulter-chisel, field cultivate with drag, disc with harrogator, planted with same planter.
3 Spring plow, harrowgate with packer, disc with harrogator, planted with same planter.

PLOT NO.	1	2	3
Tillage treatment	No-till	Fall coulter-chisel	Spring plow
TOTAL VALUE	$181.07	$192.74	$222.22
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00
Fertilizer:			
Broadcast 300# 0-0-60	22.50	22.50	22.50
Starter 200# 11-40-11	28.50	28.50	28.50
Nitrogen applied as 28-0-0	43.20	43.20	43.20
Chemicals:			
Herbicides	39.27	27.50	27.50
Insecticides	18.35	12.85	12.85
Interest: 7 months @ 14%	15.66	14.25	14.25
TOTAL VARIABLE COSTS	$207.48	$188.80	$188.80
Machinery (custom rates)			
Primary tillage	$ -	$ 8.25	$ 11.00
Secondary tillage	-	11.50	10.50
Planting	11.00	8.00	8.00
Cultivation	-	-	-
Spraying, spread fertilizer	9.00	6.00	6.00
Apply ammonia	-	-	-
Harvest	19.50	19.50	19.50
Trucking	11.09	12.92	13.54
TOTAL MACHINERY COSTS	$ 50.59	$ 66.17	$ 68.54
TOTAL COSTS	$258.07	$254.97	$257.34
RETURN TO LAND, MANAGEMENT	$-77.00	$-62.23	$-35.12

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Albert Heydinger, 6132 State Route 103, New Washington, Ohio 44854

PLOT DETAILS:

Planted Pioneer 3517 in three plots on May 21 in 30-inch rows. 13.5# Furadan 10G was applied in the furrow and seed was treated with Isotox "D". Intended seed drop was 29,900 of which 25,550 plants emerged in Plot 1, 28,000 plants in Plot 2 and 28,150 plants in Plot 3. Soils present are Bennington, Cardington silt loams and Pewamo silty clay loam. Tile drainage is random through the lows. 1980 crop was wheat with a clover mixture seeded in all plots. Clover was 14 inches tall in Plot 1 at planting. In spring, 300# 0-0-60 was broadcast. At planting, 200# 11-40-11 was applied as a row starter. As 28% solution 180# N was also applied with herbicides for a total N-P_2O_5-K_2O as follows: 202-80-202. Just after planting, 1 qt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 1 qt. Aatrex 4L, 2 qt. Bladex 4L and 3 pt. Dual 8E were applied to Plot 1 using 60 gallons 28% as carrier. Plots 2 and 3 were sprayed similarly but without Paraquat. Grass and broadleaf control was generally excellent, some yellow nutsedge in wet spots. On June 16, Plot 1 was sprayed with 2 qt. Toxaphene 6E for control of armyworms. No other insect problems. Harvested October 23.

While inspecting Crawford County no-till fields in June, Bob Smith, SCS, Floyd Reinhart, ASCS, and Bill Kleman, CES, discussed various aspects of conservation tillage with Art Heydinger.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Duane King, 3191 West State Route 18, Tiffin, Ohio 44883

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till (28% N)	Corn	18,400	29.2	92.3	$182.74	$267.29	$-84.55
2	Fall Miller disc (28% N)	Corn	20,500	26.5	114.7	236.56	267.43	-30.87
3	Fall Miller disc (82% N)	Corn	19,700	24.0	124.2	264.25	270.40	-6.15

TILLAGE

1 Planted with Kinze no-till planter.
2 Fall Miller disc, field cultivate, disc, planted with same planter.
3 Fall Miller disc, field cultivate (anhydrous application*), disc, planted with same planter.

PLOT NO.	1	2	3
Tillage treatment	No-till (28% N)	Fall Miller disc (28% N)	Fall Miller disc (82% N)
TOTAL VALUE	$182.74	$236.56	$264.25
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00
Fertilizer:			
Broadcast: 200# 18-46-0	26.00	26.00	26.00
Broadcast: 300# 0-0-60	22.50	22.50	22.50
Starter: 22G 6-18-6	-	22.20	22.20
Starter: 27G 6-18-6	27.75	-	-
Nitrogen applied as 28-0-0	36.03	36.03	-
Nitrogen applied as 82-0-0 (with N-Serve)	-	-	38.21
Chemicals:			
Herbicides	39.06	27.50	27.50
Insecticides	12.85	12.85	12.85
Interest: 7 months @ 14%	16.68	15.23	15.46
TOTAL VARIABLE COSTS	$220.87	$202.31	$204.72
Machinery (custom rates)			
Primary tillage	$ -	$ 8.25	$ 8.25
Secondary tillage	-	11.50	11.50*
Planting	11.00	8.00	8.00
Cultivation	-	-	-
Spraying, spread fertilizer	6.00	6.00	6.00
Apply ammonia	-	-	-
Harvest	19.50	19.50	19.50
Trucking	9.92	11.87	12.43
TOTAL MACHINERY COSTS	$ 46.42	$ 65.12	$ 65.68
TOTAL COSTS	$267.29	$267.43	$270.40
RETURN TO LAND, MANAGEMENT	$-84.55	$-30.87	$ -6.15

*Cost to apply anhydrous ammonia included in secondary tillage costs.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Duane King, 3191 West State Route 18, Tiffin, Ohio 44883

PLOT DETAILS:

Planted Pioneer 3780 in three plots on June 2 in 30-inch rows. 9# Counter 15G was banded over the rows and seed was treated with Isotox "D". Intended seed drop was 26,000 of which 19,500 plants emerged in Plot 1, 20,950 in Plot 2 and 20,950 plants emerged in Plot 3. Soil present is Blount silt loam. Tile drainage is systematic. 1980 crop was wheat seeded with clover which stood about 16 inches tall in Plot 1 at time of planting. In fall 200# 18-46-0 and 300# 0-0-60 were broadcast on all plots. In spring 200# N as anhydrous ammonia (+1 qt. N-Serve) was applied preplant during field cultivation in Plot 3. At planting 22 gallons 6-18-6 was applied as a row starter in Plots 2 and 3. In Plot 1, 27 gallons 6-18-6 was applied. As 28% solution, 150# N was applied with herbicides in Plots 1 and 2. Resulting total $N-P_2O_5-K_2O$ for Plots 1, 2 and 3, respectively were: 204-146-198, 200-134-194, and 250-134-194. Just after planting 1 qt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 1 qt. Aatrex 4L, 2 qt. Bladex 4L and 3 pt. Dual 8E were applied to Plot 1 using 50 gallons per acre 28% as carrier. Plot 2 was sprayed similarly but without Paraquat. Also after planting, the same herbicides, excluding Paraquat, were applied to Plot 3 using 30 gallons per acre water in place of 28%. Grass and broadleaf weed control generally good with some nutsedge uncontrolled in Plot 1 and thistle patches uncontrolled in Plots 2 and 3. During late June and early July, infestation of the Plot 1 stand by common stalk borer was recorded. 30-40% of plants within wet lows of the plot were damaged. About 5% of the plants on higher ground were damaged. At the same time, plants in Plots 2 and 3 were infested by first brood European corn borer. In these plots damage never exceeded 30%. Practical or economical treatment for stalk borers does not exist. As well, damage by corn borer did not exceed the economic threshold justifying treatment. Stalk lodging in all plots at harvest on November 25 undoubtedly reduced yields somewhat.

Wet conditions this spring not only delayed planting, but also kept Duane King from completing post emerge nitrogen application to portions of his demonstration. As a result, yields were less than optimal with plots representing "best management practices under the circumstances."

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Harold Crum, 6275 Johnston Road, New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	18,600	27.6	88.5	$179.06	$247.57	$-68.51
2	Fall plow	Corn	18,200	24.0	91.9	195.52	260.96	-65.44

TILLAGE

1 Planted with Allis Chalmers 600 no-till plate planter.
2 Fall plow, field cultivate 2X, field cultivate with harrow, planted with same planter.

PLOT NO.	1	2
Tillage treatment	No-till	Fall plow
TOTAL VALUE	$179.06	$195.52
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast (150# 18-46-0	19.50	19.50
Broadcast (300# 0-0-60	22.50	22.50
Starter 200# 11-40-11	28.50	28.50
Nitrogen applied as 28-0-0	36.00	36.00
Chemicals:		
Herbicides	31.06	19.50
Insecticides	6.20	6.20
Interest: 7 months @ 14%	15.01	14.06
TOTAL VARIABLE COSTS	$198.77	$186.26
Machinery (custom rates)		
Primary tillage	$ -	$ 11.00
Secondary tillage	-	18.00
Planting	11.00	8.00
Cultivation	-	-
Spraying, spread fertilizer	9.00	9.00
Apply ammonia	-	-
Harvest	19.50	19.50
Trucking	9.30	9.20
TOTAL MACHINERY COSTS	$ 48.80	$ 74.70
TOTAL COSTS	$247.57	$260.96
RETURN TO LAND, MANAGEMENT	$-68.51	$-65.44

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Donald Crum, 6275 Johnston Road, New Washington, Ohio 44854

PLOT DETAILS:

Planted Migro 2022X in two plots on May 22 in 38-inch rows. Intended seed drop was 29,000 of which 21,500 plants emerged in Plot 1 and 18,900 plants emerged in Plot 2. Accidental failure to match seed type to proper planting plate caused uneven seed spacing in the rows. As a result plants typically emerged in groups of 2 or 3. Seed was treated with Isotox "D". Soil present is Lenawee silty clay loam. Tile drainage is systematic. 1980 crop was wheat with a clover mixture seeded in both plots. Clover was 12 inches tall in Plot 1 at planting. In spring, 150# 18-46-0 and 300# 0-0-60 were broadcast. At planting 200# 11-40-11 was applied as a row starter. As 28% solution 150# N was applied with herbicides for a total N-P_2O_5-K_2O as follows: 199-149-202. Just after planting, 1 qt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons water, 2 qt. Aatrex 4L and 3 qt. Lasso 4E were applied to Plot 1 using 50 gallons 28% as carrier. Plot 2 was sprayed similarly but without Paraquat. Three times during June both plots were under water as a result of excessive amounts of rain. On June 9, both plots were sprayed with 2 qt. Toxaphene 6E for control of armyworms and cutworms. Some corn rows were damaged during application. Generally grass control was good and broadleaf control excellent. Foxtail and fall panicum were prevalent in areas of reduced stand. Harvested November 4.

While flooding of the Donald Crum field several times in June reduced final stand and contributed to some nitrogen loss, yields from no-till and fall plow portions of the demonstration plot remained similar.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Tony Schock, 10838 East Township Road 106, Attica, Ohio 44807

PLOT NO.	TILLAGE	CROP	FINAL STAND	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Corn	21,800	29.2	136.3	$269.86	$269.47	$ 0.39

TILLAGE

1 Planted with John Deere 7000 conservation planter.

PLOT NO.	1
Tillage treatment	No-till
TOTAL VALUE	$269.86
Seed, lime, misc.	$ 40.00
Fertilizer:	
Broadcast 300# 0-0-60	22.50
Starter 350# 10-26-26	36.92
Nitrogen applied as 28-0-0	36.00
Chemicals:	
Herbicides	44.69
Insecticides	16.19
Interest: 7 months @ 14%	16.03
TOTAL VARIABLE COSTS	$212.33
Machinery (custom rates)	
Primary tillage	$ -
Secondary tillage	-
Planting	11.00
Cultivation	-
Spraying, spread fertilizer	12.00
Apply ammonia	-
Harvest	19.50
Trucking	14.64
TOTAL MACHINERY COSTS	$ 57.14
TOTAL COSTS	$269.47
RETURN TO LAND, MANAGEMENT	$ 0.39

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Tony Schock, 10838 East Township Road 106, Attica, Ohio 44807

PLOT DETAILS:

Planted Cargill 921 on May 4 in 36-inch rows. 11.1# Furadan 10G was applied in in the furrow and seed was treated with Isotox "F". Intended seed drop was 26,700 of which 24,300 emerged in the Blount silt loam and Digby loam soils. No tile drainage present. Natural soil drainage in this field is good. 1980 crop was alfalfa which stood about 15 inches tall at planting. In spring, 300# 0-0-60 was broadcast. 350# 10-26-26 was applied as a row starter. As 28% solution, 150# N was also applied for a total $N-P_2O_5-K_2O$ as follows: 185-91-271. Just after planting, 1 qt. Paraquat CL with 16 oz. X-77 spreader per 100 gallons 28%, 1.5 qt. Aatrex 4L, 3 qt. Bladex 4L and 2.5 pt. Dual 8E were applied using 50 gallons per acre 28% as carrier. On June 11, 0.25 pt. 2,4-D plus 0.5 pt. Banvel D were sprayed as part of a total weed control program and to complete kill of alfalfa. Grass and broadleaf control was excellent. On June 16, field was sprayed with 2 qt. Toxaphene 6E for control of armyworms. No other insect problems. Harvested October 23.

After the spraying of his alfalfa sod, Tony Schock, with Seneca District technician Lynn Eberhard, checked the field for initial weed kill and seed sprouting. By September Tony felt nitrogen available from the sod was quite important in sustaining his crop through the growing season.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Phil Dunn, 7500 East County Road 12, Bloomville, Ohio 44818

PLOT NO.	TILLAGE	CROP	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Soybeans	15.4	46.0	$284.66	$138.74	$145.92

TILLAGE

1 Planted into cornstalks with a no-till Moore Uni-drill.

PLOT NO.	1
Tillage treatment	No-till
TOTAL VALUE	$284.66
Seed, lime, misc.	$ 40.00
Fertilizer:	
Broadcast 225# 6-15-40	20.81
Chemicals:	
Herbicides	30.13
Insecticides	2.50
Interest: 6 months @ 14%	6.54
TOTAL VARIABLE COSTS	$ 99.98
Machinery (custom rates)	
Primary tillage	$ -
Secondary tillage	-
Planting	11.00
Cultivation	-
Spraying, spread fertilizer	6.00
Apply ammonia	-
Harvest	17.50
Trucking	4.26
TOTAL MACHINERY COSTS	$ 38.76
TOTAL COSTS	$138.74
RETURN TO LAND, MANAGEMENT	$145.92

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Phil Dunn, 7500 East County Road 12, Bloomville, Ohio 44818

PLOT DETAILS:

Planted Agripro 26 soybeans on May 21 in 6-5/8 inch rows. Planting rate was 184,800 seeds (80#) per acre of which 147,350 plants emerged in the Tiro silt loam soils. Seed was innoculated with Kalo triple-noctin L seed treater. Tile drainage is random. 1980 crop was no-till corn. In spring 225# 6-15-40 was broadcast for a total $N-P_2O_5-K_2O$ applied as follows: 14-34-90. Just after planting 1.0 pt. Paraquat CL with 8 oz. X-77 spreader/100 gallons water, 2.6 pt. Dual 8E and 1 pt. Sencor 4L were applied using 55 gallons water per acre as carrier. Grass control was excellent with good broadleaf control, escape of some common ragweed. Volunteer corn, the major weed problem, resulted from tillage action of the drill on ears of lodged corn from the previous year. Bean leaf beetle was present but populations never reached a threshold requiring treatment. Harvested October 3.

Volunteer corn, while detracting from field appearance, did not detract from yield in Phil Dunn's no-till soybeans. Use of a no-till drill after failure to harvest down corn from the previous year was, according to Phil, the main reason for volunteer corn.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Sam Allen, 7155 East County Road 6, Bloomville, Ohio 44818

PLOT NO.	TILLAGE	CROP	MOISTURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Soybeans	13.2	15.9	$ 99.22	$144.62	- $ 45.40
2	Spring plow	Soybeans	13.8	21.2	132.07	159.18	- 27.11

TILLAGE

1 Planted with Allis-Chalmers 600 no-till planter, 30" rows
2 Spring plow, disc 2X, cultimulch 1X, plant with same planter, row cultivate 1X

PLOT NO.	1	2
Tillage treatment	No-till	Spring plow
TOTAL VALUE	$ 99.22	$132.07
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast 100# 0-46-0	11.05	11.05
Broadcast 200# 0-0-60	15.00	15.00
Chemicals:		
Herbicides	35.53	22.50
Insecticides	-	-
Interest: 6 months @ 14%	7.11	6.20
TOTAL VARIABLE COSTS	$108.69	$ 94.75
Machinery (custom rates)		
Primary tillage	$ -	$ 11.00
Secondary tillage	-	15.50
Planting	11.00	8.00
Cultivation	-	4.50
Spraying, spread fertilizer	6.00	6.00
Apply ammonia	-	-
Harvest	17.50	17.50
Trucking	1.43	1.93
TOTAL MACHINERY COSTS	$ 35.93	$ 64.43
TOTAL COSTS	$144.62	$159.18
RETURN TO LAND, MANAGEMENT	$ -45.40	$ -27.11

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Sam Allen, 7155 East County Road 6, Bloomville, Ohio 44818

PLOT DETAILS:

Planted Pfizer CX 290 soybeans in two plots on May 23 in 30-inch rows. (Note: Row spacings of 18 inches or less are generally recommended for optimal soybean production, conventionally and no-till.) Planting rate in both plots was 150,000 seeds (60#) per acre of which 111,500 plants emerged in Plot 1 and 113,300 plants emerged in Plot 2. Soils are Tiro and Bennington silt loams. Tile drainage is adequate but of random design. 1980 crop was corn with tillage comparisons corresponding to those of the 1981 soybean tillage demonstration. 100# 0-46-0 and 200# 0-0-60 were spring broadcast for a total N-P_2O_5-K_2O applied on both plots as follows: 0-46-120. Just after planting 1 qt. Paraquat CL with crop oil, 2.5 pt. Dual 8E and 7/8 pt. Sencor 4L were applied to Plot 1 using 20 gallons water per acre as carrier. Plot 2 was sprayed similarly but without Paraquat. After emergence about 1/2 acre of narrow spray skips were hand sprayed with Blazer 2S. Excellent grass control and good broadleaf control with some common ragweed present. No insect problems. Harvested on October 3.

Narrow row soybeans not only improve yields, but also afford better erosion control as a result of more uniform plant distribution across the field in early spring. Such benefits would have undoubtedly helped Sam Allen this year when June storms were intense enough to wash corn stalks from the no-till portion of his field.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Don Phenicie, 5661 Stevens Road, New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Soybeans	12.2	49.8	$311.25	$155.63	$155.62
2	No-till	Soybeans	11.1	42.4	265.00	154.97	110.03
3	Fall chisel	Soybeans	11.1	47.4	296.25	157.61	138.64
4	Fall disc	Soybeans	11.1	43.1	269.38	154.47	114.91
5	Fall plow	Soybeans	11.2	46.1	288.12	166.24	121.88

TILLAGE

1 Planted into 3' tall rye after corn with Allis-Chalmers 333 no-till air planter, extra units on 15" spacing.
2 Planted into cornstalks with same planter.
3 Fall chisel, spring field cultivate, planted with same planter.
4 Fall disc, spring field cultivate, planted with same planter.
5 Fall plow, spring field cultivate 2X, planted with same planter.

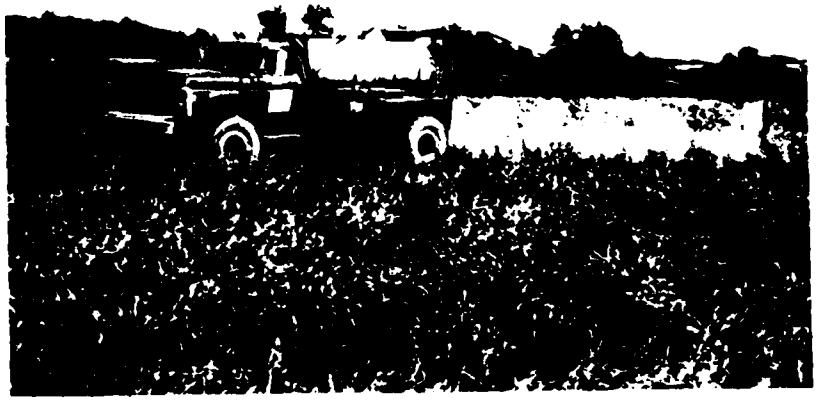
PLOT NO.	1	2	3	4	5
Tillage treatment	No-till w/rye	No-till	Fall chisel	Fall disc	Fall plow
TOTAL VALUE	$311.25	$265.00	$296.25	$269.38	$288.12
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00	$ 40.00	$ 40.00
Fertilizer:					
Broadcast 100# 0-46-0	11.05	11.05	11.05	11.05	11.05
Broadcast 300# 0-0-60	22.50	22.50	22.50	22.50	22.50
Chemicals:					
Herbicides	34.97	34.97	26.50	26.50	26.50
Insecticides	.50	.50	.50	.50	.50
Interest: 6 months @ 14%	7.63	7.63	7.04	7.04	7.04
TOTAL VARIABLE COSTS	$116.65	$116.65	$107.59	$107.59	$107.59
Machinery (custom rates)					
Primary tillage	$ -	$ -	$ 8.25	$ 5.50	$ 11.00
Secondary tillage	-	-	6.00	6.00	12.00
Planting	11.00	11.00	8.00	8.00	8.00
Cultivation	-	-	-	-	-
Spraying, spread fertilizer	6.00	6.00	6.00	6.00	6.00
Apply ammonia	-	-	-	-	-
Harvest	17.50	17.50	17.50	17.50	17.50
Trucking	4.48	3.82	4.27	3.88	4.15
TOTAL MACHINERY COSTS	$ 38.98	$ 38.32	$ 50.02	$ 46.88	$ 58.65
TOTAL COSTS	$155.63	$154.97	$157.61	$154.47	$166.24
RETURN TO LAND, MANAGEMENT	$155.62	$110.03	$138.64	$114.91	$121.88

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Don Phenicie, 5661 Stevens Road, New Washington, Ohio 44854

PLOT DETAILS:

Planted with innoculation Gold Tag 1250 soybeans in 5 different side-by-side tillage plots on May 25 in 15-inch rows. Planting rate was 245,280 seeds (84#) per acre of which 159,600 plants emerged in Plot 1; 167,300 in Plot 2; 162,000 in Plot 3, 161,300 in Plot 4; and 158,600 plants in Plot 5. Soil in the plots is Bennington silt loam. Tile drainage is random. 1980 crop was corn with tillage comparisons corresponding to those of the 1981 soybean tillage demonstration. 100# 0-46-0 and 300# 0-0-60 was fall broadcast for a total N-P_2O_5-K_2O applied on all plots as follows: 0-46-180. Just after planting 1.5 pt. Paraquat CL with 8 oz. X-77 spreader/ 100 gallons water, 3 pt. Dual 8E and 1 pt. Sencor 4L were applied to Plots 1 and 2 using 50 gallons water per acre as carrier. Plots 3, 4 and 5 were sprayed similarly but without Paraquat. Rye in Plot 1 was 3 feet tall when sprayed. Beans in Plot 1 did not suffer from moisture stress during August. Excellent grass and broadleaf control in all plots. No insect problems. Harvested September 28.



During the past two years, Don Phenicie has found that planting no-till soybeans after corn into rye enables early planting on firm soils. Further, the extra residue minimizes crop moisture stress during summer.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Don Crum, 5473 New Haven Road, Shelby, Ohio 44875

PLOT NO.	TILLAGE	CROP	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Soybeans	13.6	41.1	$256.05	$132.75	$123.30

TILLAGE

1 Planted into cornstalks with a no-till Moore Uni-drill.

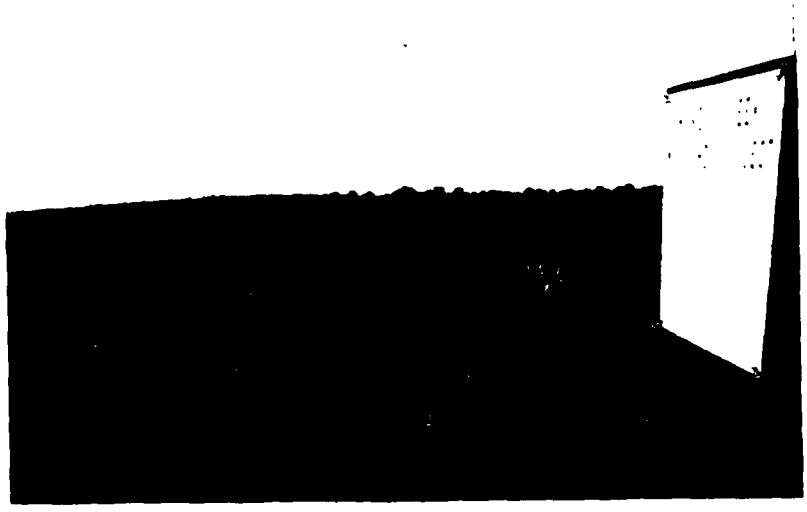
PLOT NO.	1
Tillage treatment	No-till
TOTAL VALUE	$256.05
Seed, lime, misc.	$ 40.00
Fertilizer:	
Broadcast 200# 0-0-60	15.00
Chemicals:	
Herbicides	32.84
Insecticides	.50
Interest: 6 months @ 14%	6.18
TOTAL VARIABLE COSTS	$ 94.52
Machinery (custom rates)	
Primary tillage	$ -
Secondary tillage	-
Planting	11.00
Cultivation	-
Spraying, spread fertilizer	6.00
Apply ammonia	-
Harvest	17.50
Trucking	3.73
TOTAL MACHINERY COSTS	$ 38.23
TOTAL COSTS	$132.75
RETURN TO LAND, MANAGEMENT	$123.30

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Donald Crum, 5473 New Haven Road, Shelby, Ohio 44875

PLOT DETAILS:

Planted with innoculation Voris 295 soybeans on May 22 in 6-5/8" rows. Planting rate was 202,540 seeds (82#) per acre of which 173,900 plants emerged in the Pewamo silty clay loam and the Alexandria, Cardington and Bennington silt loams. Predominant soil type in the plot is Cardington silt loam. No tile drainage present. 1980 crop was no-till corn; 1979 crop was no-till soybeans. 200# of 0-0-60 was spring broadcast for a total N-P_2O_5-K_2O applied as follows: 0-0-120. Several small patches of quackgrass were spot treated with Roundup 4EC. 1 qt. Paraquat CL with X-77 spreader at 8 oz./100 gallons water, 3 qt. Lasso 4E, 3/4 pt. Lexone 4L were applied just after planting using 50 gallons water per acre as carrier. Excellent grass and broadleaf control except for some common ragweed. Little volunteer corn. No insect problems. Harvested October 13.



Three years of experience with no-till soybeans have convinced Don Crum that the practice is here to stay.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Jerry Bumb, 3474 East Township Road 163, Sycamore, Ohio 44882

PLOT NO.	TILLAGE	CROP	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till	Soybeans	15.6	35.5	$218.95	$134.59	$ 84.36
2	Spring plow	Soybeans	14.6	41.1	252.20	136.99	115.21

TILLAGE

1 Planted into cornstalks with a no-till Moore Uni-drill.
2 Spring plow, disc-cultipack-drag 2X, plant with Moore Uni-drill.

PLOT NO.	1	2
Tillage treatment	No-till	Spring plow
TOTAL VALUE	$218.95	$252.20
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast 200# 0-0-60	15.00	15.00
Chemicals:		
Herbicides	32.16	19.00
Insecticides	.50	.50
Interest: 6 months @ 14%	6.14	5.22
TOTAL VARIABLE COSTS	$ 93.80	$ 79.72
Machinery (custom rates)		
Primary tillage	$ -	$ 11.00
Secondary tillage	-	11.00
Planting	11.00	8.00
Cultivation	-	-
Spraying, spread fertilizer	9.00	6.00
Apply ammonia	-	-
Harvest	17.50	17.50
Trucking	3.29	3.77
TOTAL MACHINERY COSTS	$ 40.79	$ 57.27
TOTAL COSTS	$134.59	$136.99
RETURN TO LAND, MANAGEMENT	$ 84.36	$115.21

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Jerry Bumb, 3474 East Township Road 163, Sycamore, Ohio 44882

PLOT DETAILS:

Planted with innoculation Williams soybeans in two plots on May 20 in 6-5/8" rows. Intended planting rate was 190,500 seeds (75#) per acre of which 166,900 plants emerged in Plot 1 and 195,000 plants emerged in Plot 2. Soils in the plots are Gallman, Digby and Millgrove loams. Soils are not tile drained. 1980 crop was conventional corn. 200# 0-0-60 was spring broadcast for a total N-P_2O_5-K_2O applied on both plots as follows: 0-0-120. 1 qt. Paraquat CL with X-77 spreader at 8 oz./100 gallons water, 2 pt. Dual 8E, 0.8 pt. Sencor 4L were applied just after planting to Plot 1 using 50 gallons water per acre as carrier. Plot 2 was sprayed similarly but without Paraquat. In July about 1 gallon of a mixture of 1 part 2,4-D amine, 1 part Roundup 4 EC and 2 parts water was used with a sponge-wick applicator to treat hemp-dogbane and milkweek in Plot 1. Only partial control resulted since weeds were 2-3 feet tall at time of application. Excellent control of grasses and other broadleaves. Both plots suffered moisture stress in late summer. Mexican bean beetle and bean leaf beetle were present in both plots but populations did not reach a threshold requiring treatment. Harvested October 5.

After experience with both no-till corn and soybeans, Jerry Bumb found both practices to work well on his farm.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Roger Marquart, 7858 McCarthy Road, New Washington, Ohio 44854

PLOT NO.	TILLAGE	CROP	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Soybeans	13.6	50.1	$312.11	$128.82	$183.29
2	Fall plow	Soybeans	13.6	53.5	333.30	137.19	196.11

TILLAGE

1 Planted into 3-4' rye after corn, with Allis-Chalmers 600 no-till planter, extra units on 18" spacing
2 Fall, field cultivate 2X, plant with same planter

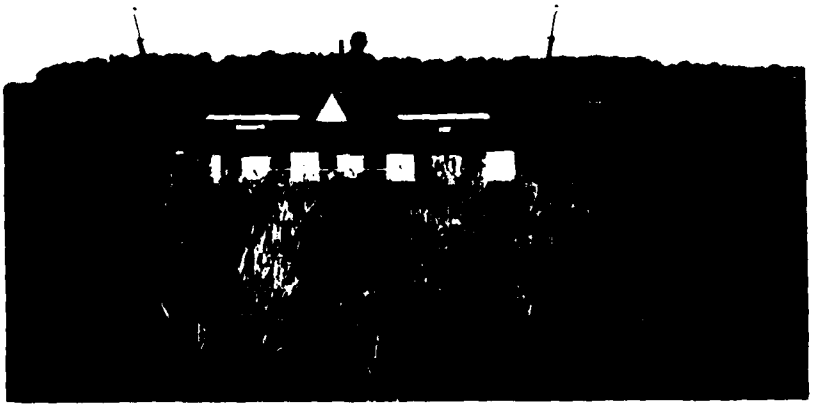
PLOT NO.	1	2
Tillage treatment	No-till w/rye	Fall plow
TOTAL VALUE	$312.11	$333.30
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast 150# 0-0-60	11.25	11.25
Chemicals:		
Herbicides	32.66	21.50
Insecticides	-	-
Interest: 6 months @ 14%	5.87	5.09
TOTAL VARIABLE COSTS	$ 89.78	$ 77.84
Machinery (custom rates)		
Primary tillage	$ -	$ 11.00
Secondary tillage	-	12.00
Planting	11.00	8.00
Cultivation	-	-
Spraying, spread fertilizer	6.00	6.00
Apply ammonia	-	-
Harvest	17.50	17.50
Trucking	4.54	4.85
TOTAL MACHINERY COSTS	$ 39.04	$ 59.35
TOTAL COSTS	$128.82	$137.19
RETURN TO LAND, MANAGEMENT	$183.29	$196.11

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Roger Marquart, 7858 McCarthy Road, New Washington, Ohio 44854

PLOT DETAILS:

Planted Agripro 26 soybeans in two plots on May 25 in 18 inch rows. Intended planting rate was 184,800 seeds (80#) per acre of which 188,800 plants emerged in Plot 1 and 172,100 plants emerged in Plot 2. Soils in the plots are Tiro and Condit-Bennington silt loams. Tile drainage is adequate but random. 1980 crop was corn with tillage comparisons corresponding to those of the 1981 soybean tillage demonstration. In spring 150# 0-0-60 was broadcast for a total $N-P_2O_5-K_2O$ applied on both plots as follows: 0-0-90. At planting rye in Plot 1 was 3-4 feet tall. Just after planting 1 qt. Paraquat CL with 8 oz. X-77 spreader/100 gallons water, 3 qt. Lasso 4E and 0.8 pt. Sencor 4L were applied to Plot 1 using 50 gallons water per acre as carrier. Plot 2 was sprayed similarly but without Paraquat. During mid-July no-till beans in Plot 1 showed stress from excessive moisture. In late summer, plants following conventional tillage in Plot 2 showed stress from lack of moisture. Bean leaf beetle was more prevalent in Plot 1 but populations never reached a threshold requiring treatment. Grass and broadleaf control was good except for the escape of some common ragweed in Plot 1. Harvested October 3.



Elimination of soil crusting, reduced herbicide damage to plants, mulching of weeds and late summer moisture conservation were advantages of no-till soybeans noted by Roger Marquart.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Rich Reichert, 16161 East US-224, Attica, Ohio 44807

PLOT NO.	TILLAGE	CROP	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Soybeans	13.8	41.8	$260.41	$134.49	$125.92
2	Spring plow	Soybeans	13.4	39.1	243.99	146.79	97.20

TILLAGE

1 Planted into 18-22" rye after corn with John Deere 7000 no-till planter, doubled back to obtain 18" rows.
2 Spring plow, field cultivate with drag 3X, planted with same planter.

PLOT NO.	1	2
Tillage treatment	No-till with rye	Spring plow
TOTAL VALUE	$260.41	$243.99
Seed, lime, misc.	$ 40.00	$ 40.00
Fertilizer:		
Broadcast 100# 0-0-60	7.50	7.50
Chemicals:		
Herbicides	37.26	26.10
Insecticides	-	-
Interest: 6 months @ 14%	5.93	5.15
TOTAL VARIABLE COSTS	$ 90.69	$ 78.75
Machinery (custom rates)		
Primary tillage	$ -	$ 11.00
Secondary tillage	-	18.00
Planting	16.50	12.00
Cultivation	-	-
Spraying, spread fertilizer	6.00	6.00
Apply ammonia	-	-
Harvest	17.50	17.50
Trucking	3.80	3.54
TOTAL MACHINERY COSTS	$ 43.80	$ 68.04
TOTAL COSTS	$134.49	$146.79
RETURN TO LAND, MANAGEMENT	$125.92	$ 97.20

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC

Rich Reichert, 16161 East US-224, Attica, Ohio 44807

PLOT DETAILS:

Planted Voris 295 soybeans in two plots on May 21 in 18-inch rows. Planting rate was 172,900 seeds (70#) per acre of which 132,100 plants emerged in Plot 1 and 140,800 plants emerged in Plot 2. Soil in the plots is Blount silt loam. Tile drainage is random. 1980 crop was corn with tillage comparisons corresponding to those of the 1981 soybean tillage demonstration. In spring, 100# 0-0-60 was broadcast for a total N-P_2O_5-K_2O applied on both plots as follows: 0-0-60. At planting rye in Plot 1 was 18-22 inches tall. Just after planting 1 qt. Paraquat CL with 8oz. X-77 spreader/100 gallons water, 3 pt. Dual 8E and 2# Lorox 50W were applied to Plot 1 using 50 gallons water per acre as carrier. Plot 2 was sprayed similarly but without Paraquat. Excellent grass and good broadleaf control, a few small patches of cocklebur in Plot 1. No insect problems. Harvested October 5.

Rich Reichert found a rye cover crop helpful in reducing erosion on slopes in his field prior to planting no-till soybeans. Rich combined no-till with contour planting to further reduce chances of excessive erosion.

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Tom Niese, 7552 Sawyer Road, Tiro, Ohio 44887

PLOT NO.	TILLAGE	CROP	MOIS-TURE	YIELD DRY/BU/AC	TOTAL VALUE	TOTAL COSTS	RETURN TO LAND, MGT.
1	No-till with rye	Soybeans	13.4	38.9	$242.73	$238.69	$ 4.04
2	Spring plow	Soybeans	12.1	38.7	241.88	229.51	12.37
3	Spring plow (stale seedbed)	Soybeans	13.0	40.8	255.00	233.96	21.04

TILLAGE

1 Planted into 8-10" tall dead rye after soybeans with a no-till Moore Uni-drill.
2 Spring plow and field cultivate 3 weeks before planting, field cultivate just before planting with Moore Uni-drill.
3 Spring plow, field cultivate and cultimulch 3 weeks before planting with Moore Uni-drill (stale seedbed system).

PLOT NO.	1	2	3
Tillage Treatment	No-till w/rye	Spring plow	Spring plow
TOTAL VALUE	$242.73	$241.88	$255.00
Seed, lime, misc.	$ 40.00	$ 40.00	$ 40.00
Fertilizer:			
Broadcast 300# 7-21-32	32.10	32.10	32.10
Broadcast 200# 0-0-60 plus 20 Mn	30.40	30.40	30.40
Chemicals:			
Herbicides	75.93	51.50	56.88
Insecticides	.70	.70	.70
Interest: 6 months @ 14%	12.54	10.83	11.21
TOTAL VARIABLE COSTS	$191.67	$165.53	$171.29
Machinery (custom rates)			
Primary tillage	-	$ 11.00	$ 11.00
Secondary tillage	-	12.00	10.50
Planting	$ 11.00	8.00	8.00
Cultivation	-	-	-
Spraying, spread fertilizer	15.00	12.00	12.00
Apply ammonia	-	-	-
Harvest	17.50	17.50	17.50
Trucking	3.52	3.48	3.67
TOTAL MACHINERY COSTS	$ 47.02	$ 63.98	$ 62.67
TOTAL COSTS	$238.69	$229.51	$233.96
RETURN TO LAND, MANAGEMENT	$ 4.04	$ 12.37	$ 21.04

1981 TILLAGE COMPARISON CULTURAL & ECONOMIC DATA

Tom Niese, 7552 Sawyer Road, Tiro, Ohio 44887

PLOT DETAILS:

Planted Vickery soybeans in three plots on May 23 in 6-5/8 inch rows. Planting rate was 255,600 seeds (90#) per acre of which 188,900 plants emerged in Plot 1, 160,700 in Plot 2 and 152,700 plants in Plot 3. Seed was treated with Isotox "D". Soils in the plots are Olmstead silty clay loam and Bennington, Cardington silt loams. Tile drainage is systematic. 1980 crop was no-till soybeans. In fall 300# 7-21-32 was broadcast and 200# 0-0-60 (with 20# manganese) was spring broadcast for a total $N-P_2O_5-K_2O$ applied on all three plots as follows: 21-63-216. Before spring plowing 1.75 qt. Roundup 4 EC with 32 gallons water per acre as carrier was applied in Plots 2 and 3 to control perennial weeds. Two weeks before planting, Plot 1 was treated similarly to kill the 3 foot tall rye cover crop. At planting rye was 8-10 inches tall and dead. Just after planting 1 pt. Paraquat CL with 8 oz. X-77 spreader/100 gallons water, 2.5 pt. Dual 8E and 0.5# Lexone DF were applied to Plots 1 and 3 using 32 gallons water per acre as carrier. Plot 2 was sprayed similarly but without Paraquat. In late June, 2 pt. Blazer 2S with 20 gallons water per acre as carrier was applied in Plot 1 to control milkweed and nightshade. Nightshade control was excellent, milkweed control was partial. Overall control of grasses and other broadleaves was excellent. No insect problems. Harvested September 25.

Killing rye prior to planting is sometimes necessary when uncontrolled growth would interfere with proper planter operation or leave excessive amounts of mulch on the surface. Tom Niese used Roundup 4EC to kill rye preplant and to control perennial weeds at the same time.

Universal Soil Loss Equation

$$A = R \times K \times LS \times C \times P$$

A - computed soil loss in tons per acre per year
R - erosion potential of rainfall
K - soil erodibility factor for a specific soil type
LS - slope length and slope steepness factor
C - cropping-management factor (vegetative cover, crop rotations, tillage practices, residue management)
P - erosion control practices (contour tillage, strip cropping)

These factors permit calculation of soil loss in tons per acre per year that might be expected over a long period of time. Calculated losses may then be compared to permissible soil loss values for different soils. Permissible losses are the maximum rate of erosion tolerable without loss of long term soil productivity. Tolerence factors for soils within demonstration plots are as follows:

Soil	Tolerance Factor (T/Ac/Yr)	"K" Factor
Bennington (silt loam)	3	.43
Blount (silt loam)	3	.43
Cardington (silt loam)	5	.37
Gallman (silt loam)	5	.32
Haskins (loam)	4	.37
Lenawee (silt clay loam)	4	.28
Tiro (silt loam)	4	.37

Soil Loss Calculations

For all demonstration plots, soil losses (erosion) were calculated using the Universal Soil Loss Equation (see facing page). Factors in the equation are soil type, normal rainfall amount and intensity, soil erodibility, slope length, slope steepness and conservation practices (reduced tillage, cross-slope farming, etc.). Soil erodibility data were based on predominant soil types in the 5-15 acre plots. Slope length and steepness were measured in the field and amounts of surface residue were estimated shortly after planting. In soil loss calculations all residue were converted to corn residue equivalent: i.e., 500# soybean, small grain, or sod residue equals approximately 1000# corn residue.

Erosion control is directly and most significantly related to the amount of residue maintained on the soil surface. The two major factors in this calculation are (1) type and amount of residue, and (2) the percentage of residue left on the soil surface by tillage practices. Without at least 1000# corn residue equivalent per acre on the surface, soil erosion is not reduced significantly. Calculations were made assuming the following amounts of residue produced per acre: 100 bu. corn produces approximately 5600#; 50 bu. soybeans produces approximately 2500#; 45 bu. wheat produces approximately 4500#; a 12-inch clover plowdown mixture produces approximately 1000# residue per acre; and a 30-inch rye or wheat cover crop produces approximately 1800#. The amount of residue left on the surface after 30% winter loss is directly related to the type of tillage tools used, and the depth at which they are used. For example, the amount of residue incorporated below the surface for some different tillage operations are as follows:

Tillage Operation	% Incorporated Below Soil Surface /1
Moldboard plow	100%
Chisel (shanks spaced 12-15")	
A. Straight shovel points (7" deep)	30 - 50%
B. Twisted shovel points (7" deep)	50 - 70%
Coultered chisel (6-7" deep)	60 - 70%
Tandem or offset disc	
(6-7" deep)	60 - 70%
(4-5" deep)	40 - 50%
(3-4" deep)	30 - 40%
Field cultivator w/sweeps (4-5" deep)	30%

/1 Based on the Soil Conservation Service "Technical Guide," and field experience.

TABLE 9. DEMONSTRATION PLOT SOIL LOSS PREDICTIONS

Cooperator	Ziegler			Phenicie	
Soil type /1	Tiro SiLo			Cardington SiLo	
Allow "T" Soil loss ton/ac/yr /2	4			5	
Crop rotation /3	Cont. Corn			Cont. Corn	
1981 crop	Corn			Corn	
Slope length	250'			150'	
Slope	1%			4%	
Plot # /4	1	2	3	1	2*
Tillage /5	No-till	Reduced	F. Plow	No-till	F. Plow
Residue type	Corn	Corn	-	Corn	-
Estimated # surface residue just after plant /6	5600	1150	0	7000	0
Estimated surface cover just after planting	70%	19%	0	71%	0
Average annual est. soil loss ton/ac/yr	.5	1.8	3.2	.7	9.2
Reduction over compared plow system	85%	44%	-	93%	-

Cooperator	Geissman		Kalb			H. Crum	
Soil type /1	Tiro SiLo		Bennington SiLo			Blount SiLo	
Allow "T" Soil loss ton/ac/yr /2	4		3			3	
Crop rotation /3	CCSb		CCSb			CCSbMM	
1981 Crop	Corn		Corn			Corn	
Slope length	180'		200'			180'	
Slope	2%		3%			4.5%	
Plot # /4	1	2	1	2	3	1	2
Tillage /5	No-till	S. Plow	No-till	Reduced	F. Plow	No-till	S. Plow
Residue type	Corn /rye	-	Corn /rye	Corn	-	Corn /rye	-
Estimated # surface residue just after plant /6	4770	0	6150	900	0	6900	0
Estimated surface cover just after planting	56%	0	95%	8%	0	72%	0
Average annual est. soil loss ton/ac/yr	.8	4.2	.7	5.7	8.1	.75	5.5
Reduction over compared plow system	81%	-	91%	30%	-	86%	-

/1 Predominent soil type of 5-15 acre plots. Si = silt, Lo = loam, Cl = clay.
/2 T = tolerable soil loss in ton/ac/yr for a certain soil type.
/3 In many no-till situations cover crops may be in the rotation; i.e., Sbx. C = corn, Sb = soybeans, W = wheat, M = meadow, x = cover crop, i.e., rye, wheat, clover.

TABLE 9. DEMONSTRATION PLOT SOIL LOSS PREDICTIONS

Depinet			Price		Fritz		Niese Bros.	
Blount SiLo			Tiro SiLo		Bennington SiLo		Cardington SiLo	
3			4		3		5	
Cont. Corn			Cont. Corn		CCSb		CCSb	
Corn			Corn		Corn		Corn	
180'			250'		160'		250'	
4%			3%		2.5%		4%	
1	2	3	1	2*	1	2	1	2
No-till	Reduced	F. Plow	No-till	F. Plow	No-till	F. Plow	No-till	Reduced
Corn	Corn	-	Corn	-	Corn	-	Corn /rye	Corn
5500	1000	0	8900	0	3550	0	5800	<500
63%	19%	0	88%	0	63%	0	88%	8%
1.8	6.7	10.4	0.5	7.0	2.1	6.8	0.7	6.7
83%	36%	-	93%	-	69%	-	89%	-

Jacoby			Don Crum		Spitzer		Smith	
Blount SiLo			Bennington SiLo		Gallman Lo		Blount SiLo	
3			3		5		3	
CCSb			CSb		CSb		CSbX	
Corn			Corn		Corn		Corn	
225'			180'		400'		200'	
3%			2.5%		1%		2.5%	
1	2	3	1	2	1	2	1	2
No-till	Reduced	F. Plow	No-till	S. Plow	No-till	S. Plow	No-till	F. Plow
Corn /rye	Corn /rye	-	Soybean	-	Soybean	-	Soybean /rye	-
3430	1890	0	2080	0	1855	0	2700	0
36%	22%	0	48%	0	44%	0	90%	0
2.5	4.9	8.3	1.0	6.0	1.1	3.0	1.0	7.2
70%	41%	-	83%	-	63%	-	86%	-

/4 Plots with asterisks mean no field trial exists. Situation is used to compare differences in tillage and estimated soil loss.

/5 S. plow = spring plow, F. plow = fall plow, Reduced = any tillage method between no-till and plowing.

/6 Some plots had residue left from cropping 2 years ago, estimated amount included.

TABLE 9. DEMONSTRATION PLOT SOIL LOSS PREDICTIONS

Cooperator	Hall			Vanasdale		
Soil type /1	Tiro SiLo			Tiro SiLo		
Allow "T" Soil loss ton/ac/yr /2	4			4		
Crop rotation /3	CSBX			CSbX		
1981 crop	Corn			Corn		
Slope length	250'			300'		
Slope	1%			2%		
Plot # /4	1	2	3	1	2	3
Tillage /5	No-till	Reduced	S. Plow	No-till	Reduced	S. Plow
Residue type	Soybean /rye	Soybean	-	Soybean /rye	Soybean	-
Estimated # surface residue just after plant /6	3210	<500	0	2960	<500	0
Estimated surface cover just after planting	84%	<5%	0	88%	<5%	0
Average annual est. soil loss ton/ac/yr	.33	3.7	3.7	1.0	5.2	5.2
Reduction over compared plow system	91%	0%	-	81%	0%	0%

Cooperator	Heydinger			D. King		
Soil type /1	Bennington SiLo			Blount SiLo		
Allow "T" Soil loss ton/ac/yr /2	3			3		
Crop rotation	CSbWx			CSbW		
1981 crop	Corn			Corn		
Slope length	200'			175'		
Slope	2.5%			3%		
Plot # /4	1	2	3	1	2	3
Tillage /5	No-till	Reduced	S. Plow	No-till	Reduced	S. Plow
Residue type	Wheat/ clover	Wheat/ clover	-	Wheat	Wheat	
Estimated # surface residue just after plant /6	4000	<500	0	5200	<500	0
Estimated surface cover just after planting	91%	<5%	0	95%	<5%	0
Average annual est. soil loss ton/ac/yr	0.6	4.0	4.0	0.7	4.2	4.2
Reduction over compared plow system	85%	0%	-	83%	0%	-

/1 Predominent soil type of 5-15 acre plots. Si = silt, Lo = loam, Cl = clay.
/2 T = tolerable soil loss in ton/ac/yr for a certain soil type.
/3 In many no-till situations cover crops may be in the rotation; i.e., SbX. C = corn, Sb = soybeans, W = wheat, M = meadow, X - cover crop, i.e., rye, wheat, clover.

TABLE 9. DEMONSTRATION PLOT SOIL LOSS PREDUCTIONS

Studer			Eckstein		G. King		
Bennington SiLo			Bennington SiLo		Haskins Lo		
3			3		4		
CSbX			CSbX		CSb		
Corn			Corn		Corn		
180'			250'		250'		
4%			4%		1.5%		
1	2	3	1	2	1	2	3*
No-till	Reduced	F. Plow	No-till	S. Plow	No-till	Reduced	S. Plow
Soybean /rye	Soybean	-	Soybean /rye	-	Soybean /wheat	Soybean	-
1850	<500	0	4150	0	2510	<500	0
37%	<5%	0	95%	0	95%	< 5%	0
3.2	11.2	11.2	0.8	10.4	0.7	3.6	3.6
71%	0%	-	92%	-	80%	0%	-

D&D Crum		Schock		Dunn		Allen	
Lenawee SiClLo		Blount SiLo		Tiro SiLo		Tiro SiLo	
4		3		4		4	
CSbWX		CCSbWMM		CSbWX		CSb	
Corn		Corn		Soybeans		Soybeans	
500'		175'		250'		160'	
.5%		3%		2%		3%	
1	2	1	2*	1	2*	1	2
No-till	F. Plow	No-till	S. Plow	No-till	S. Plow	No-till	S. Plow
Wheat /clover	-	Alfalfa	-	Corn	-	Corn	-
3700	0	900	0	4500	0	3500	0
97%	0	49%	0	71%	0	43%	0
0.17	1.5	1.8	3.3	0.7	3.0	2.0	5.3
88%	-	55%	0	76%	-	63%	-

/4 Plots with asterisks mean no field trial exists. Situation is used to compare differences in tillage and estimated soil loss.

/5 S. plow = spring plow, F. plow = fall plow, Reduced = any tillage method between no-till and plowing.

/6 Some plots had residue left from cropping 2 years ago, estimated amount included.

TABLE 9. DEMONSTRATION PLOT SOIL LOSS PREDUCTIONS

Cooperator	Phenicie					Don Crum	
Soil type /1	Bennington SiLo					Cardington SiLo	
Allow "T" Soil loss ton/ac/yr /2	3					5	
Crop rotation /3	CSb					CSb	
1981 crop	Soybeans					Soybeans	
Slope length	150'					180'	
Slope	2.5%					4.5%	
Plot # /4	1	2	3	4	5	1	2*
Tillage /5	No-till	No-till	Reduced	Reduced	F. Plow	No-till	S. Plow
Residue type	Corn /rye	Corn	Corn	Corn	-	Corn	-
Estimated # Surface residue just after plant /6	5000	3920	1250	1600	0	3880	0
Estimated surface cover just after planting	92%	63%	19%	25%	0	41%	0
Average annual est. soil loss ton/ac/yr	1.2	1.9	3.7	3.7	7.3	3.4	10.4
Reduction over compared plow system	84%	74%	49%	49%	-	67%	-

Cooperator	Bumb		Marquart		R. Reichert		T. Niese	
Soil type /1	Gallman Lo		Tiro SiLo		Blount SiLo		Bennington SiLo	
Allow "T" Soil loss ton/ac/yr /2	5		4		3		3	
Crop rotation /3	CSb		CSbWX		CSbWX		SbXSbW	
1981 crop	Soybeans		Soybeans		Soybeans		Soybeans	
Slop length	200'		250'		300'		250'	
Slope	2%		1%		5%		1.5%	
Plot # /4	1	2	1	2	1	2	1	2
Tillage /5	No-till	S. Plow	No-till	F. Plow	No-till	S. Plow	No-till	S. Plow
Residue type	Corn	-	Corn /rye	-	Corn /rye	-	Soybean /rye	-
Estimated # surface residue just after plant /6	5110	0	6250	0	6080	0	2850	0
Estimated surface cover just after planting	71%	0	94%	0	67%	0	80%	0
Average annual est. soil loss ton/ac/yr	0.75	4.6	0.50	1.8	1.0	6.0	0.7	2.8
Reduction over compared plow system	84%	-	72%	-	83%	-	75%	-

/1 Predominent soil type of 5-15 acre plots. Si = silt, Lo = loam, Cl = clay.
/2 T = tolerable soil loss in ton/ac/yr for a certain soil type.
/3 In many no-till situations cover crops may be in the rotation; i.e., SbX. C - corn, Sb = soybeans, W = wheat, M = meadow, X = cover crop, i.e., rye, wheat, clover.
/4 Plots with asterisks mean no field trial exists. Situation is used to compare differences in tillage and estimated soil loss.
/5 S. plow = spring plow, F. plow = fall plow, Reduced = any tillage method between no-till and plowing.
/6 Some plots had residue left from cropping 2 years ago, estimated amount included.

Eroded soil and nutrients from fields within the Honey Creek watershed end up in Lake Erie quickly following large storms.

Algae-Sediment plume entering Lake Erie from Sandusky Bay following June, 1981, storms.

SUMMARY - 1981

1. In a year of extreme wetness during most of the early growing season (May, June), less than adequate field drainage, aggravated by crop residues on the soil surface, caused decreased corn yields as a result of reduced plant vigor (coolness, wetness) and nitrogen fertilizer losses. For reduced tillage and no-till practices, where drainage was good to excellent or where amounts of crop residue were moderate to low (soybean straw only, partial residue incorporation by tillage), corn yields remained comparable to those from plowed fields:

Tillage System	No. Checks	Yield, bu/ac
No-till corn after:		
corn	9	113.4
corn, cover crop	4	96.2
soybeans	2	118.0
soybeans, cover crop	7	92.9
wheat, clover sod	4	93.7
alfalfa	1	136.3
rye	1	103.7
No-till, all rotations	28	103.8
Reduced--chisel, disc, etc.	12	114.8
Conventional--plow	12	116.9

2. For a third consecutive year, average no-till soybean yields equalled or exceeded plow yields. Also, residue from rye cover crops seemed to benefit yields of no-till soybeans after corn through moisture conservation during a dry August.

Tillage System	No. Checks	Yield, bu/ac
No-till soybeans after:		
corn	4	41.3
corn, rye cover	3	47.2
soybeans, rye cover	1	38.9
No-till, all rotations	8	43.2
Reduced--chisel, disc, etc.	4	45.2
Conventional--plow	4	43.2

3. As indicated in "1" above, rye cover crop establishment prior to planting no-till corn tended in situations of less than adequate drainage to reduce yields. As well, most fields having a rye cover crop required Toxaphene treatment for armyworm control. These facts suggest that rye cover crops be employed only where existing crop residues are insufficient to control erosion.

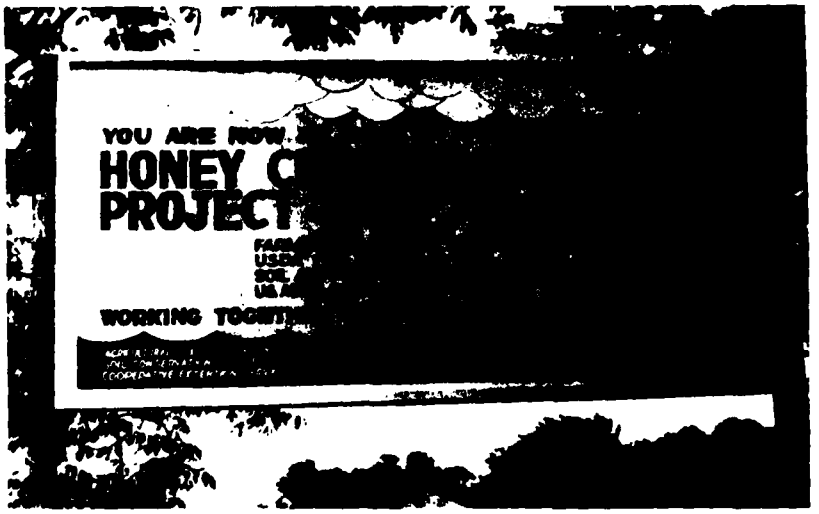
4. Phosphorus fertility trials done in the Mark Fritz tillage demonstration plot indicated that in a field of high phosphorus fertility, broadcast and/or starter applications of the nutrient had little influence on yield in either no-till or fall plow systems.

5. Reduced yields from adverse weather, increased cost for drying high moisture grain and low market prices all combined to significantly depress profit over previous years of the Honey Creek Project. Comparatively, however, economics of reduced and no-tillage systems appeared favorable after a third year of observation, particularly for soybeans. Large yield decreases in several no-till plots severely hurt average yield ("1" above) and in turn average return to land and management.

For corn, return to land and management, for 28 no-till demonstrations, ranged from a low of -$185.87 per acre to a high of $40.03 per acre and averaged -$58.44. Return from 12 reduced tillage demonstrations ranged from -$130.13 to $70.63 and averaged -$39.46 per acre. Returns from 12 conventional demonstrations ranged from -$108.49 to $56.05 and averaged -$28.14 per acre.

For soybeans, return to land and management, for 8 no-till demonstrations ranged from $4.04 to $183.29 per acre and averaged $116.56 per acre. Two reduced tillage demonstrations showed returns of $114.91 and $138.64 per acre, an average of $126.78. Returns from 6 conventional demonstrations ranged from $12.37 to $196.11 per acre and averaged $93.97.

6. Erosion reductions with reduced and no-tillage practices can be very significant, especially for no-till. From USLE calculations (not measurements) done for 31 no-till plots, 30 showed soil loss reductions of 50% or more while 20 showed reductions of 80% or more. Reductions averaged 79%. For 12 reduced tillage plots, 4 showed soil loss reductions of 40% or more, 2 showed reductions of 36% and 31% while 6 showed no reductions. Reductions averaged 24%. Calculated soil losses for conventional plots or systems averaged 6.0 T/Ac/Yr.



Disappearance of these signs from the Honey Creek area does not mean that erosion and water quality problems have been solved! The job has really just begun. With your continued help, the job can be done voluntarily.

THREE YEAR SUMMARY OF YIELDS

One goal of the Honey Creek Project was using conservation tillage to produce yields of corn and soybeans which would be acceptable to area farmers. That goal has been met. Table 10 shows that no-tillage and reduced tillage (chisel plowing, discing, etc.) corn and soybean yields were at or above the averages for the respective crops in Crawford, Huron, and Seneca counties, over the three year life of the project. Clearly, conservation tillage has produced competitive yields.

It also seemed quite important to demonstrate that conservation tillage would produce yields comparable to plowing in the same field. Research findings indicate that the major soils of the Honey Creek area are rather insensitive to tillage (when properly drained). When two tillage systems are compared on these soils, each will produce the highest yield about half the time. If one compares conservation tillage to plowing on a number of sites on these soils, a success rate of 50 percent or greater is perfectly acceptable.

Many comparison sites were planted during the Honey Creek Project. A summary of success is shown in Table 10. A successful comparison was one in which a conservation tillage system produced a yield greater than, equal to, or fewer than 10 bu/A less than the yield of a plowed plot in the same field. The 10 bu/A figure allows for reasonable and unavoidable error in obtaining yields. The comparable figure for soybeans is 4 bu/A.

The project was successful in demonstrating that both corn and soybeans can be produced in a given field using conservation tillage at yield levels comparable to plowing. Soybeans were generally more successful than corn. There are two major reasons for this, both of which are easy to explain.

Site descriptions indicated that many demonstration fields possessed less than optimum drainage. It is known that poor drainage and the resulting wetness decreases yields in conservation tillage systems to a greater extent than yields in plow based systems, thereby decreasing the probability of a successful comparison. Since wetness would normally be more of a problem for earlier planted corn than later planted soybeans, poor drainage biased conditions in favor of the soybeans.

Nitrogen fertilizers are used in corn production, but not in producing soybeans. Urea, a major nitrogen material and ingredient in nitrogen solutions, is lost through volatilization to a greater extent on conservation tillage than on plowed ones. Urea and solutions were used on many corn comparison plots. Weather was conducive for volatilization in 1980, decreasing probability of success on these plots. Volatilization was not a problem for soybeans, because no nitrogen fertilizer was applied.

Volatility probably caused few problems in 1981, but again, nitrogen was most likely the reason why successes with corn were fewer than for soybeans. Many growers planted no-till corn into rye cover crops. When the rye was killed, it blanketed already wet soils and kept them wet. This situation promoted denitrification which lowered yields and again decreased the probility of success with corn. More armyworm damage was also found in corn planted in rye cover crops.

Several principles of conservation tillage can be learned from the Honey Creek experience. Both corn and soybeans <u>can be</u> produced quite successfully

in the Honey Creek area using conservation tillage systems. Improving drainage will improve chances for success (better drained sites were more successful). Care must be taken in the use of urea fertilizers (guidelines are available from Extension). Obtaining adequate stands and controlling weeds, the most critical factors in any conservation tillage system are possible using equipment and materials available today. Finally, use of rye cover crops, particularly in corn production, should be regarded with caution, unless extra management steps are taken. In this project, use of rye has hurt more people than it has helped.

We hope that you will study the results of this project and learn from them. We hope that these results will help you to improve production on your own farm, and that our success will encourage you to try tillage systems which will not only maintain yields, but will decrease erosion and improve water quality.

Table 10. Summary of corn and soybean performance over three years in Honey Creek plots.

TILLAGE	YIELDS		SUCCESS RATES*	
	corn	soybeans	corn	soybeans
	(bu/ac)		(%)	
No-tillage	116	46	52	91
Reduced tillage	125	42	82	67
3 County Average**	116	46	-	-

*Average values. Value varies between reports depending on how multiple comparisons on one farm are treated.

**1981 yields included. Estimated by D. J. Eckert after consultation with Ohio Crop Reporting Service.

This THREE YEAR SUMMARY OF YIELDS
was prepared by Donald J. Eckert,
Ohio Cooperative Extension Service

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